Newland

NLS-EM3000

OEM Scan Engine

Integration Guide

Version 1.0

Revisions

Version	Description	Date
Pre-release	Initial release	26-08-2009
Version 1.0	Support as from EM3000 firmware Version 3.02.001 and higher.	11-03-2010

Disclaimer

© 1999-2008 by Newland Auto-ID Tech. Co., Ltd, All rights reserved.
No part of this publication may be reproduced, transmitted, or used in any form or by any means, electrical or mechanical, without prior written permission from Newland Auto-ID. The material in this manual is subject to change without notice.

All software, including firmware, is provided strictly on an “as is” basis and is provided without further warranty. Newland Auto-ID grants to the user a non-transferable and non-exclusive license to use each software or firmware program delivered hereunder (licensed program). Except as noted below, such license may not be assigned, sublicensed, or otherwise transferred by the user without prior written consent of Newland Auto-ID. No right to copy a licensed program in whole or in part is granted except as permitted under copyright law or as hereinafter expressly provided. The user agrees to maintain Newland Auto-ID’s copyright notice on the licensed programs delivered hereunder, and to include the same on any authorized copies it makes in whole or in part. The user agrees not to decompile, disassemble, decode, or reverse engineer any licensed program or product delivered to the user or any portion thereof.

Newland Auto-ID reserves the right to make changes and improvements to any software or product for reliability, function, or design.

Newland Auto-ID does not assume any responsibility or liability arising out of, or in connection with, the application or use of any product, circuit, or application described herein.

No license is granted, either expressly or implicitly, estoppels, or otherwise under any Newland Auto-ID intellectual property rights. An implied license only exists for equipment, circuits, and subsystems contained in Newland Auto-ID products.

Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation. All other product or service names are the property of their respective owners.

Newland Auto-ID Tech. Co., Ltd,

Content

About this guide

Introduction 1
Chapter Description 1
Graphic Notations 1
Newland Auto-ID Support Center 2

About EM3000

Introduction 3
Highlights of the EM3000 3
Get Familiar With EM3000 4
  Unpacking 4
  Outline of EM3000 4
EM3000 Decode Zone 5
EM3000 Overall Specifications 6

Mechanical Interface

Introduction 7
Dimensions of EM3000 Unit 8
  EM3000 Front View 8
  EM3000 Right Side View 8
  EM3000 Bottom View 8
Interface(24PIN-12PIN) 9
  Interface Socket 9
  Interface Cable 9
  Interface Socket Pin Assignment and Definition 10
  12-Pins End of Flexible Cable Pin Assignment and Definitions 11
  Schematic of Interface Socket 12
  Sample Interface Flexible Cable Specifications 13
Interface(12PIN-12PIN) 14
  Interface Socket 14
  Interface Cable 14
  Interface Socket Pin Assignment and Definition 15
  Schematic of Interface Socket 16
  Sample Interface Flexible Cable Specifications 17
Housing Design Considerations 18
  Housing Structure 18
  Scan Window 18
  Temperature 18

Electrical Interface

Introduction 19
The 24 Pin to 12 Pin Signal map 20
  Interface Signal levels 20
Input signals 21

Output Signals 21
A Sample Schematic of Beeper Driving Circuit: 22
A Sample Schematic of LED Driving Circuit: 22

Software Interface

Introduction 23
Trigger EM3000 for a Reading 24
Hard Trigger 24
Auto Scan 24
Continuous Scan Mode 24
Serial Port Communication 25
EM3000 Initiated Data Upload 25
Barcode Message 26
Host Initiated Commands 27

Development Tools

Introduction 31
Evaluation Kit, EVK3000&1300 32
QuickSet 33
Software Development Kit 34

Programming the Engine

Introduction 35
Code Programming 35
Command Programming 35
QuickSet Programming 35
Programming Notation 36
Code Programming On/Off 37
Illumination 38
Aiming 39
Beep 40
Decoding Beep 40
Decoding Beep Type 40
Decoding Beep Volume 41
Power On Beep 41
Beep Denotation (Beeper Definitions) 41
Reading Mode 42
Reading Timeout and Delay 43
Sensitivity 44
Exposure Imaging Mode 45
Default 46
Factory Default 46
User Default 46
Query Product Information 47

RS232 Interface

Introduction 48
Serial Port 49
Baud Rate 49
Parity Check 50
Hardware Auto Flow Control（only for HR200） 50
Data Bits Transmitted 51
Stop Bits 51

Symbols

Introduction 52
General Options 53
Disable Reading All 53
Enable Reading All 53
Enable Reading All 1D 53
Disable Reading All 1D 53
Enable Reading All 2D 54
Disable Reading All 2D 54
Code 128 55
Load Factory Default 55
Enable/Disable Code 128 55
Select Message Length 56
EAN-8 57
Load Factory Default 57
Enable/Disable UCC/EAN-8 57
Check Digit 57
2 Digits Addenda Code 58
5 Digits Addenda Code 58
EAN-8 expand to EAN-13 59
EAN-13 60
Load Factory Default 60
Disable/EnableEAN-13 60
Check Digit 60
2 Digits Addenda Code 61
5 Digits Addenda Code 61
UPC-E 62
Load Factory Default 62
Disable/Enable UPC-E 62
Check Digit 62
2 Digits Addenda Code 63
5 Digits Addenda Code 63
Transmit Default “0” 64
UPC-E Expand to UPC-A 64
UPC-A 65
Load Factory Default 65
Disable/Enable UPC-A 65
Check Digit 65

2 Digits Addenda Code 66
5 Digits Addenda Code 66
Transmit Default “0” 67
Interleaved 2 of 5 68
Load Factory Default 68
Disable/Enable Interleaved 2 of 5 68
Select Message Length 69
Check Digit 70
Specified Lengths 71
ITF-14 72
ITF-6 73
Code 39 74
Load Factory Default 74
Enable/Disable Code 39 74
Transmit Start & Stop Character 74
Select Message Length 75
Check Digit 76
Decode ASCII 76
Codabar 77
Load Factory Default 77
Enable/Disable Codabar 77
Select Message Length 78
Check Digit 79
Transmit Start & Stop Character 80
Code 93 81
Load Factory Default 81
Enable /Disable Code 93 81
Select Message Length 82
Check Digit 83
UCC/EAN-128 84
Load Factory Default 84
Enable/Disable UCC/EAN-128 84
GS1 Databar 85
Load Factory Default 85
Enable/Disable GS1 Databar 85
Transmit AI(01) Character 85
EAN·UCC Composite 86
Load Factory Default 86
Enable/Disable EAN·UCC Composite 86
Code 11 87
Load Factory Default 87
Enable/Disable Code 11 87
Select Message Length 88
Check Digit 89
ISBN 90
Load Factory Default 90
Enable/Disable ISBN 90
Transmit 90

Industrial 25 91
Load Factory Default 91
Enable/Disable Industrial 25 91
Select Message Length 92
Check Digit 93
Standard 25 94
Load Factory Default 94
Enable/Disable Standard 25 94
Select Message Length 95
Check Digit 96
Plessey 97
Load Factory Default 97
Enable/Disable Plessey 97
Select Message Length 98
Check Digit 99
MSI-Plessey 100
Load Factory Default 100
Enable/Disable MSI-Plessey 100
Select Message Length 101
Check Digit 102
PDF417 103
Load Factory Default 103
Enable/Disable PDF417 103
Select Message Length 104
PDF417 Twin Code 105
Forward/Positive Direction PDF 417 105
QR Code 106
Load Factory Default 106
Enable/Disable QR Code 106
Select Message Length 107
QR Twin Code 108
Aztec 109
Load Factory Default 109
Enable/Disable Aztec 109
Select Message Length 110
Reading Multi-barcodes of an Image 111
The number of Multi-barcodes 112
Data Matrix 113
Load Factory Default 113
Enable/Disable Data Matrix 113
Select Message Length 114
Data Matrix Twin Code 115
Rectangular Symbols 116
Forward/Positive Direction Data Matrix 116
Maxicode 117
Load Factory Default 117
Enable/Disable Maxicode 117
Select Message Length 118

OCR

Introduction 119

Prefix/Suffix

Introduction 120
General Programming 121
Disable or Enable Prefix/Suffix 121
Prefix Sequences 122
Disable or Enable User Prefix 123
Program User Prefix 123
AIM Prefix 124
Code ID Prefix 125
Code ID Default 125
Modify Code ID 126
User Suffix 129
Disable or Enable User Suffix 129
Program User Suffix 129
Stop Suffix 130
Disable or Enable Stop Suffix 130
Program Stop Suffix 130

Message Interception & Pack

Introduction 131
Message Interception 132
Programming 1D Intercept Option 133
Programming 2D Intercept Option 134
Message Pack 135
Introduction 135
Normal Pack 135

Batch Programming

Introduction 136
How to build a batch command 137
Produce setting code 138
Use batch setting code 139

Appendix

Digit Code 140
Save and Abort 142
Factory Default List 143
AIM ID List 148
Code ID List 149
Symbols ID Number 150

About this guide

Introduction

This NLS-EM3000 (“EM3000”) Scan Engine Integration Guide provides general instructions for OEM integration.

Chapter Description

About EM3000: The chapter of About EM3000 gives a brief description of the EM3000. It covers the general, overall specifications of the EM3000.

Mechanical Interface: The chapter of Mechanical Interface describes the mechanical interface of the EM3000. It includes the dimensions and locations of EM3000 mechanical components.

Electrical Interface: The chapter of Electrical Interface describes the electrical interface of the EM3000. It mainly explains the EM3000 interface socket and flexible cable. Samples of schematics are also included.

Software Interface: The chapter of Software Interface describes the software interface of EM3000. It has the serial communication protocols for queries and commands.

Development Tools: The chapter of EM3000 Development Tools lists the development tools and brief descriptions of the tools.

Programming The Engine:The chapter of Configuration lists all the configurations of EM3000. The configuration can be done through pre-printed configuration barcodes, serial port commands, and/or Quickset, a Newland software package.

Graphic Notations

Tool – Handy item for a task.

Attention – Important subject to be aware of or to avoid.

Tips – Helpful information about a topic or a feature.

Example – Illustration of how to use a feature.

Newland Auto-ID Support Center

If you have any problem with your equipment, contact the Newland Support Center in your region. Before calling, have the model number, serial number, and several of your barcodes at hand.

Call the support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is barcode readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

Note: Newland Auto-ID Tech. is not responsible for any damages incurred during shipment.

For service information, warranty information or technical assistance contact or call the Support Center listed below. For the latest service information go to *http://www.nlscan.com*

If you purchased your Newland product from a Newland Business Partner, contact that Business Partner for Service.

About EM3000

Introduction

EM3000 is an embedded barcode reading engine. Its gray scale CMOS image capturer and the Newland patented UIMG™, a Computerized Image Recognition System, ensure the fast scanning and decoding accuracy on different barcode media such as paper, plastic card, and metal surface. It can be easily integrated into OEM equipments or systems (hand-held, portable, and mounted) to provide solutions for image capture, barcode reading, and barcode message processing.

EM3000 opens its image acquisition interface and camera control to OEM developers to allow their special integration needs. EM3000 Software Development Kit is provided for easy and quick development of OEM applications.

Highlights of the EM3000

- Slim size allowing easy embedding into OEM equipments and systems.
- Outstanding decoding performance for major 1D and 2D barcodes.
- High performance CPU and image capture module ensuring fast and accurate scans.
- Easy OEM software development and firmware upgrade.

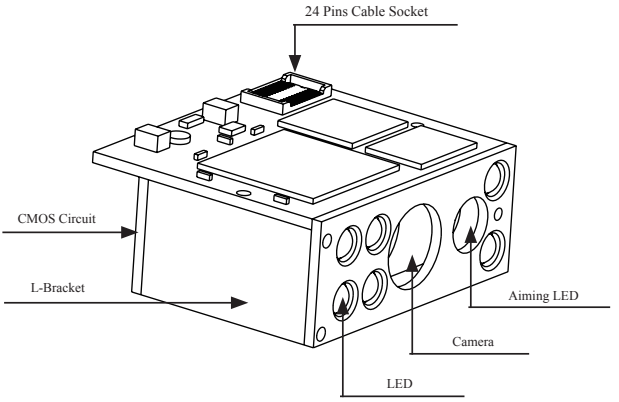
Unpacking

Remove EM3000 and accessories from the package. Check for missing parts and inspect for damage. EM3000 is packed in anti-static bag. Please handle accordingly.

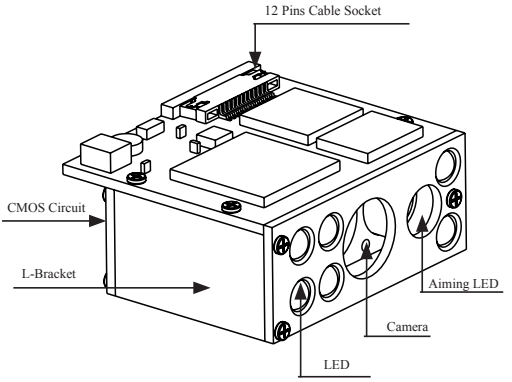
If there is any damage or missing parts, please contact your supplier at once. Keep the original package for return services, if necessary.

Outline of EM3000

The outline of EM3000 is shown below. The picture above is of EM3000 V3.4, and the one below is of EM3000 V6.

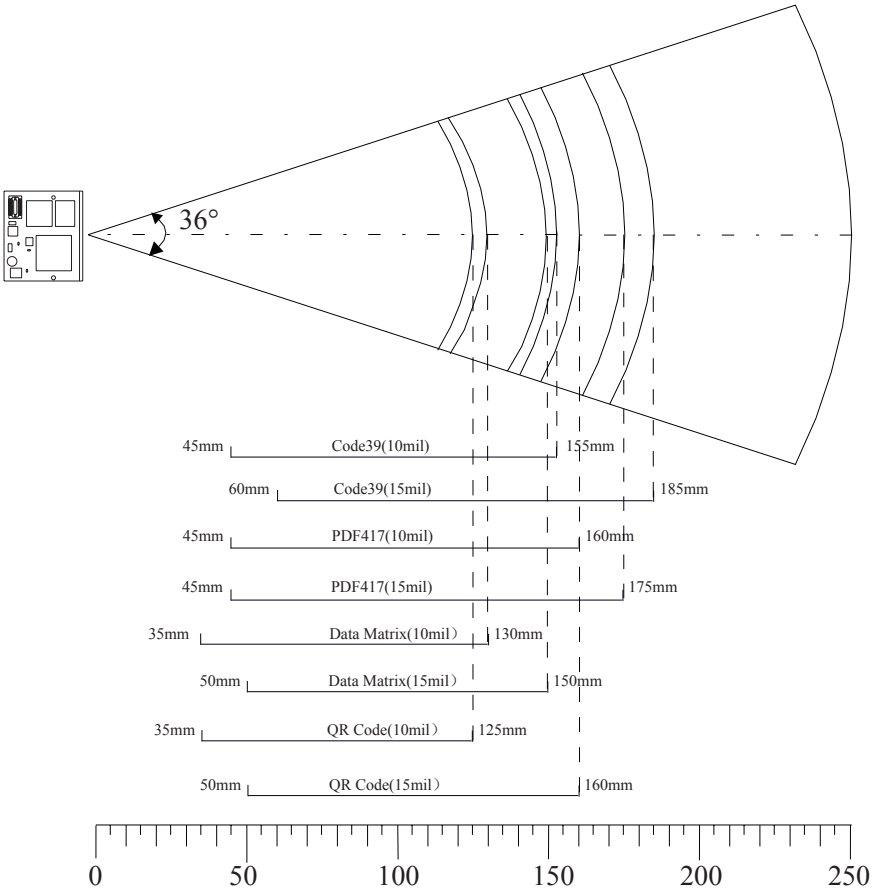


EM3000 V3.4



EM3000 V6

The view angle of the camera is 36°. Following figure shows the fields of the view at different distances.



EM3000 Overall Specifications

Image Capture Specifications		
Image Sensor		CMOS, gray scale
Resolution		752 x 480 pixels
Barcode Scan Specifications		
Symbols	2D	PDF417, QR Code(Model 1/2), DataMatrix(ECC200, ECC000, 050, 080, 100,140),Aztec, Maxicode, etc.
	1D	Code128, EAN-13, EAN-8, Code39, UPC-A, UPC-E, Codabar, Interleaved 2 of 5, ISBN, Code 93, UCC/EAN-128, GS1 Databar, etc
Precision		≥ 5mil
Depth of Scan Field		Code39(10mil):45mm-155mm; Code39(15mil):60mm-185mm PDF417(10mil):45mm-160mm; PDF417(15mil):45mm-175mm; Data Matrix(10mil):35mm-130mm; Data Matrix(15mil):50mm-150mm; QR Code(10mil):35mm-125mm; QR Code(15mil):50mm-160mm;
Print Contrast Ratio		≥ 30%
Sensitivity**	Roll	360° @ 0° Pitch and 0° Skew
	Yaw (skew)	±60° @ 0° Roll and 0° Pitch
	Pitch	±55° @ 0° Roll and 0° Skew
Illumination Specifications		
Light Source		LED (622 nm - 628 nm)
Light Intensity		330 LUX (130 mm)
Electrical and Mechanical Specifications		
Voltage		V3.4：DC 3.3 +/- 0.3 V；V6：DC3.3 + 0.3V
Current	Max	350 mA
	Working	300 mA
	Idle	60 mA
Height		13.5 mm
Width		28 mm
Length		24.5 mm
Weight		18 g
Environment Specifications		
Operating Temperature		-5℃ - +45℃
Storage Temperature		-40℃ - +60℃
Humidity		5% - 95% (non-condensing)
Ambient Illumination		0 ~ 100,000 LUX
Certificates		
FCC Part15 Class B, CE EMC Class B		

**Test Condition:
Code39: 4 Bytes ; Resolution = 10mil; W:N = 3:1 ; PCS = 1.0 ;
Barcode Height = 12mm; Distance = 100mm; T=23° C; Illumination= 200 LUX

Mechanical Interface

Introduction

This section describes theMechanical Interface.

EM3000 Front View

Following figure 1 shows the dimensions of EM3000. The figure EM3000 Front View has the width and height dimensions. The height of the EM3000 is from the bottom of EM3000 to the top of highest component on the topside.

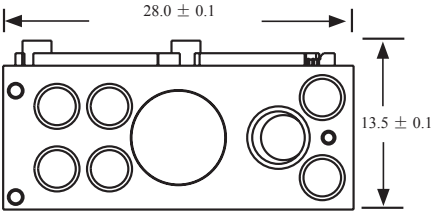


Figure 1. EM3000 Front View

EM3000 Right Side View

The figure 2 EM3000 Right Side View has the length dimensions.

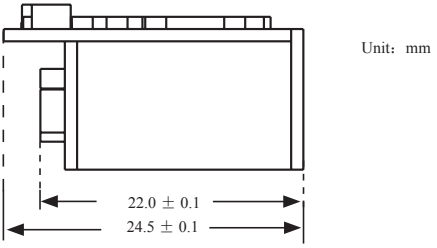


Figure 2. EM3000 Right Side View

EM3000 Bottom View

The figure 3 EM3000 Bottom View has the mounting screw specifications. The mounting screw is M2, 2 mm screw. The length of the screw into EM3000 must be less than 2.5 mm.

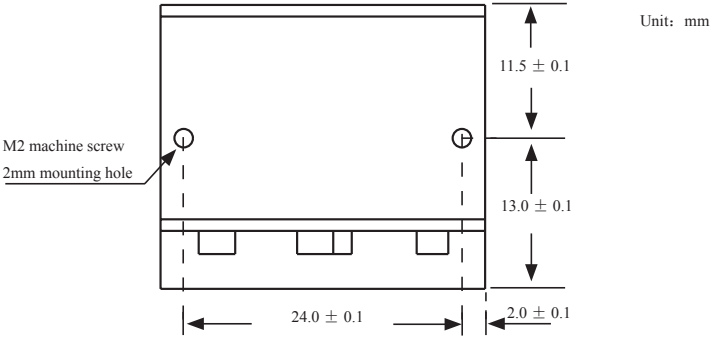


Figure 3. EM3000 Bottom View

Interface Socket

There are two versions of EM3000. One is EM3000 V3.4 which uses a 24-Pins flexible cable socket to interface with external device (Host), such as EVK3000&1300&1300, the EM3000 Evaluation Kit. Figure 4 below shows the location and dimension of the socket. The other is EM3000 V6 which uses a 12-Pins flexible cable socket. It will be decribed in this section.

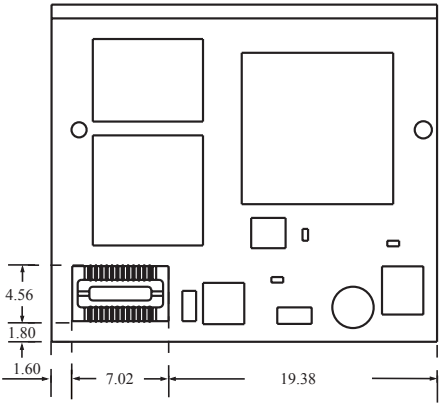


Figure 4. Interface Socket Position

Interface Cable

A flexible cable is needed when using EM3000 V3.4. The 24-Pins plug connects to the EM3000 interface socket. The other, 12-Pins end connects to external device. Figure 6 below shows how the sample cable is connected to the interface socket.

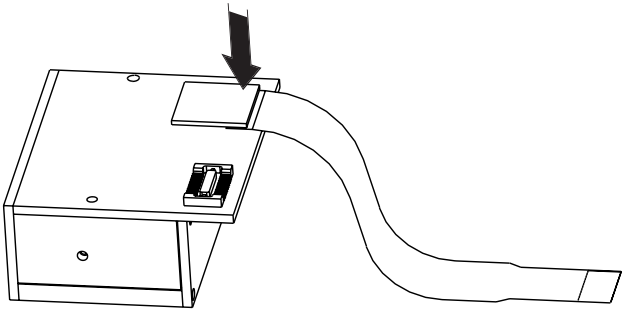
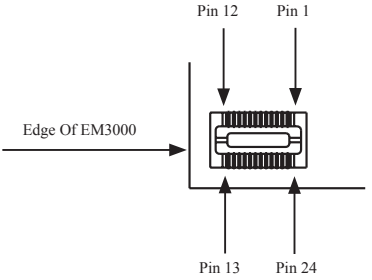


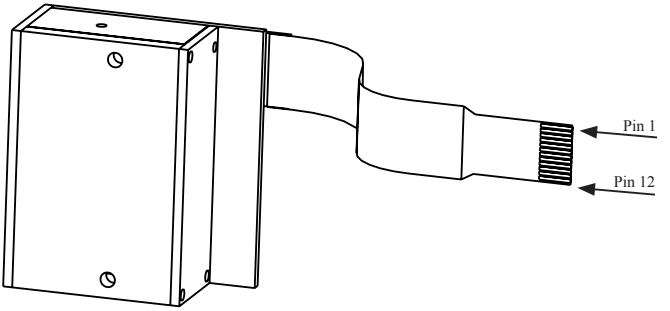
Figure 5. Flexible Cable Plug

Interface Socket Pin Assignment and Definition



Pin	Function
Pin 1	No Connection
Pin 2	Power and Signal Ground
Pin 3	No Connection
Pin 4	Power and Signal Ground
Pin 5	No Connection
Pin 6	Power and Signal Ground
Pin 7	No Connection
Pin 8	Power and Signal Ground
Pin 9	No Connection
Pin 10	Power and Signal Ground
Pin 11	No Connection
Pin 12	No Connection
Pin 13	Power and Signal Ground
Pin 14	Power and Signal Ground
Pin 15	Trigger signal, pull low longer than 20ms to initiate reading
Pin 16	Serial data output, TTL
Pin 17	Serial data input, TTL
Pin 18	EM3000 Restart signal, pull low longer than 100 μ s to restart
Pin 19	LED indicator output. If not sufficient current for LED, extra driving circuit is needed
Pin 20	Beeper output. If not sufficient current for beeper, extra driving circuit is needed
Pin 21	Power Pin, VDD：+3.3V
Pin 22	Power Pin, VDD：+3.3V
Pin 23	Power Pin, VDD：+3.3V
Pin 24	Power Pin, VDD：+3.3V

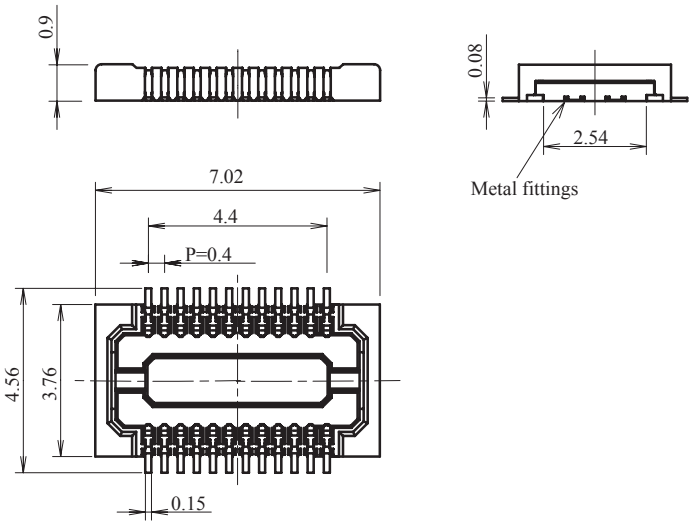
12-Pins End of Flexible Cable Pin Assignment and Definitions



Pin	Function
Pin 12	Reserved，No Connection
Pin 11	Power Supply，VDD：3.3V
Pin 10	Ground
Pin 9	Serial input port, TTL level
Pin 8	Serial output port, TTL level
Pin 7	Reserved，No Connection
Pin 6	Reserved，No Connection
Pin 5	Reserved，No Connection
Pin 4	Beeper output. If not sufficient current for LED, extra driving circuit is needed
Pin 3	LED indicator output. If not sufficient current for bepper, extra driving circuit is needed
Pin 2	EM3000 Restart signal, pull low longer than 100 μs to restart
Pin 1	Trigger signal, pull low longer than 20ms to initiate reading

Schematic of Interface Socket

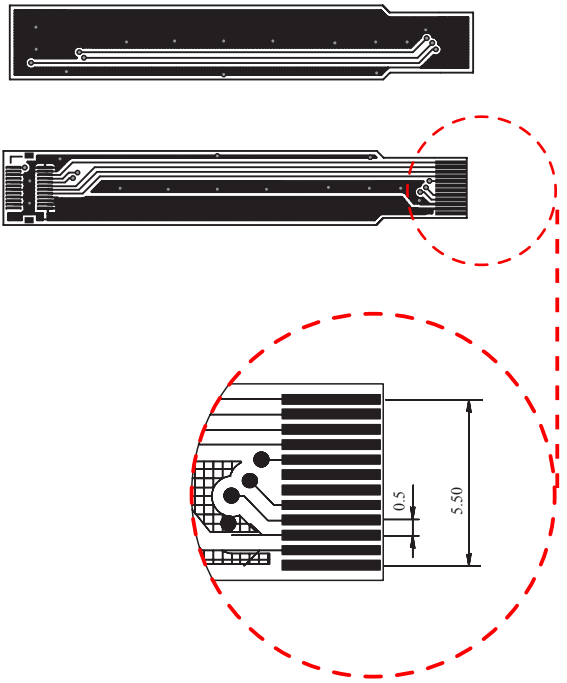
Unit：mm



Sample Interface Flexible Cable Specifications

The interface flexible cable is designed by Newland Auto-ID.

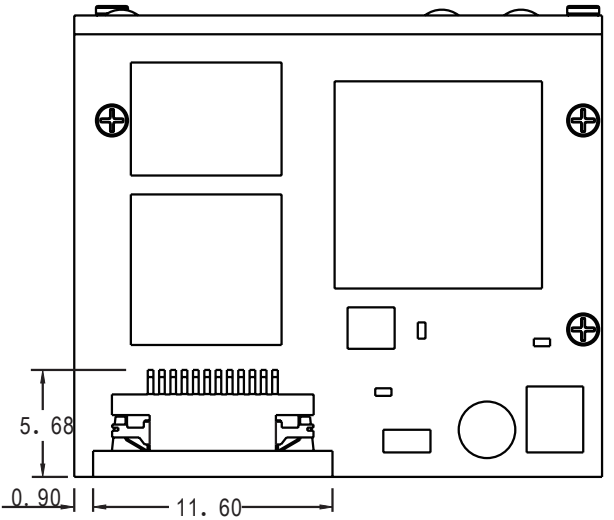
Unit：mm



Interface Socket

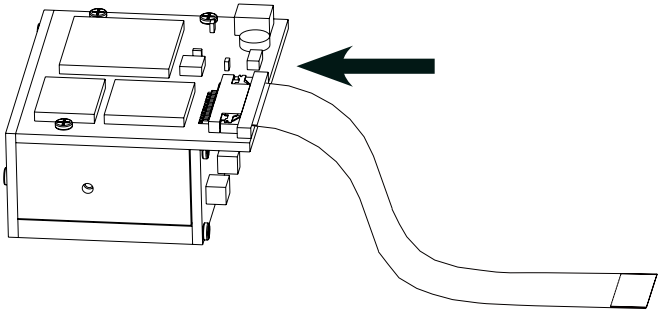
EM3000 V6 uses a ZIF 12PIN flexible cable socket to interface with external device (Host), such as EVK3000&1300&1300, the EM3000 Evaluation Kit. Figure below shows the location and dimension of the socket.

Unit：mm

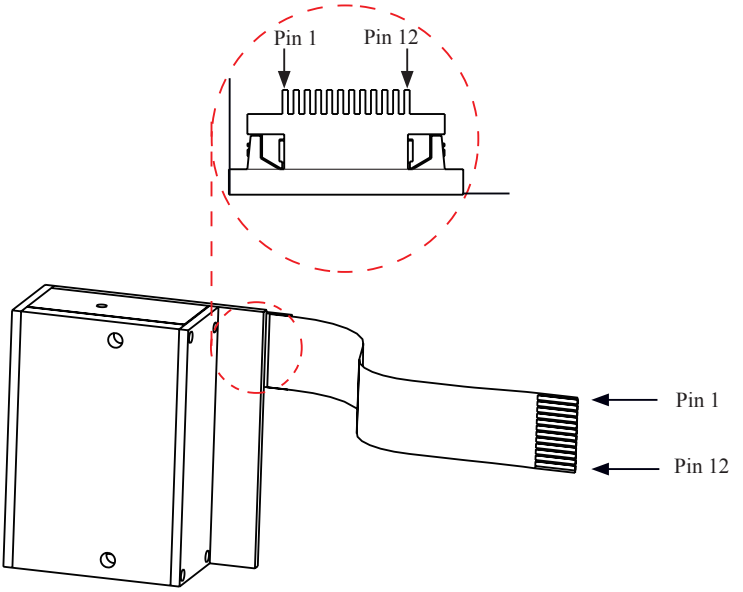


Interface Cable

A flexible cable is needed when using EM3000 V6. Both of the two ends should be 12 PINS. One connects to the EM3000 interface socket, the other connects to external device. Figure below shows how the sample cable is connected to the interface socket.



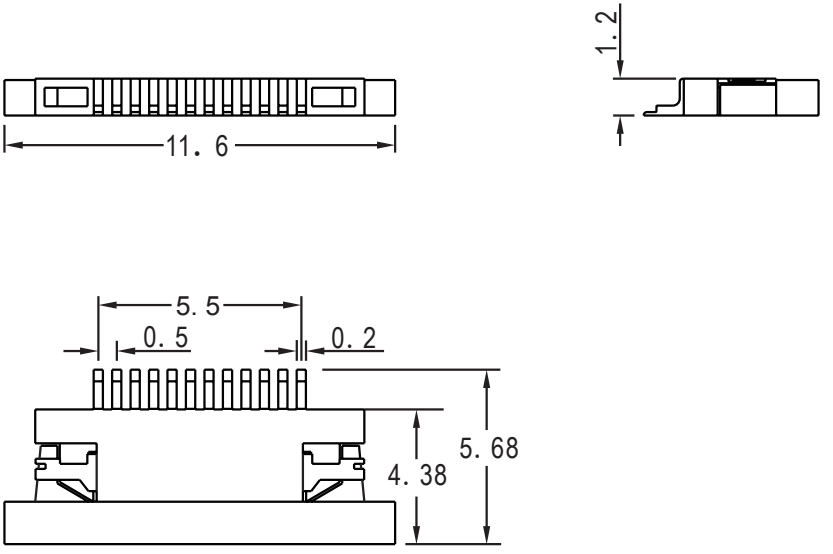
Interface Socket Pin Assignment and Definition



J1	Input/Output	Type	Definition
PIN 1	Power Supply	VCC	Power supply VCC +3.3V。If power falls to under 3.1V, EM3000 will reset automatically.
PIN 2	Power Supply	VCC	Power supply VCC +3.3V。If power falls to under 3.1V, EM3000 will reset automatically.
PIN 3	Ground	GND	—
PIN 4	Input	RX	TTL level，could not connect to PC serial signal
PIN 5	Output	TX	TTL level，could not connect to PC serial signal
PIN 6	—	NC	—
PIN 7	—	NC	—
PIN 8	Ground	GND	—
PIN 9	Output	BUZ	Beeper output. If not sufficient current for beeper, an external current amplifier is needed. If not use, it will be hung up.
PIN 10	Output	LED	LED output. If not sufficient current for beeper, an external current amplifier is needed. If not use, it will be hung up.
PIN 11	Input	RESET	EM3000 Restart signal, pull low longer than 100 μs to restart
PIN 12	Input	TRIG	Trigger signal, pull low longer than 20ms to initiate reading

Schematic of Interface Socket

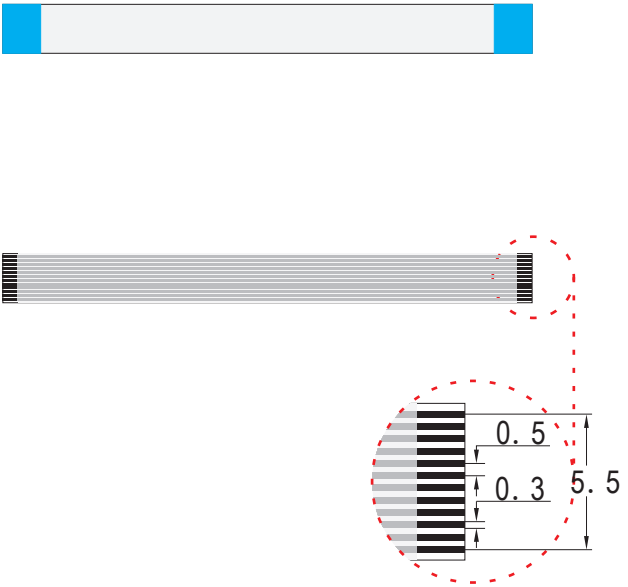
Unit：mm



Sample Interface Flexible Cable Specifications

The interface flexible cable is designed by Newland Auto-ID. The twelve metal wires of the interface flexible cable are all straight and on the same surface.

Unit：mm



Housing Structure

The housing for the Engine should be wide enough not to put any pressure on the Engine. There should be sufficient space for the flexible cable and stress release of the cable should also be considered.

Scan Window

A scan window is needed to protect camera lens, aiming light, and illumination lights. This scan window design should follow:

» Housing must not block or shade illumination LED’s, aiming light, and camera lens.

» Use high transparent and scratch resistant material,such as both side hard coated material. Please refer to following specifications:

Item		Specifications	
Dimension	Size (mm)	SIZE 1±1.0%	
	Thickness (mm)	±10%	
Property	Total light transmittance (%)	≥90% (ASTM D 1008)	
	Haze (%)	<1.0% (ASTM D 1008)	
	Stylus	≥4H (JIS K 5400)	
	Adhesion	Not release	
Appearance	Pinhole particle bubble	0.3~0.5	≤ 5EA
		<0.3	≤ 5EA
	Scratch	≤0.1mm (not crowded)	
		Under 0.05~3mm	≤3EA
Chemical	IPA（80%）	Evaluation after 1 minute dipPing	

» The gap and angle between housing window and illumination LED (highest point) must ensure that the illumination light should not be reflected into lens by window glass.

» The window must be perpendicular to the surface of the front plate of the EM3000.

Temperature

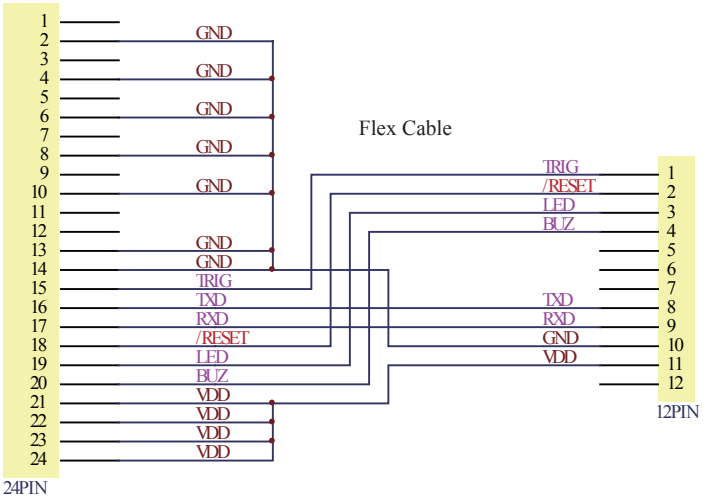
Electrical and other components generate heat. Especially under continuous operation, the temperature of the Engine will be high. The methods below are for heat concerns:
A radiator on top of the engine is recommended
Do not surround or wrap the Engine by rubber or any material that obstruct the heat dissipation.

Electrical Interface

Introduction

This section describes the electrical specifications of the interface signals.

The 24 Pin to 12 Pin Signal map



Interface Signal levels

The table below lists the interface input and output level voltage ranges

Signal Type	Voltage Level	Voltage Range
Input	High	2.0V - 3.6V
	Low	-0.3V - 0.6V
Output	High	2.4V - 3.3V
	Low	0V - 0.4V
Serial Input		3.3V
Serial Output		3.3V

Reset Input

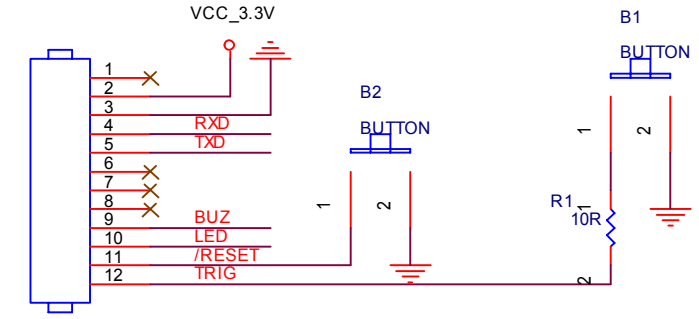
The Engine restarts itself after the Reset line is pull low for 100μs and back to high. The LED Pin will go low. The LED Pin will stay low until the Reset Pin is released and power is applied to EM3000. After the initialization, if send-beep option is enabled, the Engine will send power on beeper signal.

Trigger Input

When the Trigger line is pull low for20 ms, the Engine starts a read. The Engine keeps reading until a successful reading or the line is high. After a successful reading, the line must go high in order to make another reading.

Sample Input schematics

Here is a schematic from the evaluation board, EVK3000&1300. Those two signals can connect to external device’s output port.



12 Pins Flex Cable

Output Signals

Here are the descriptions of the output signals, beeper and LED. They can be used to detect the status of the scanning and the state of the Engine.

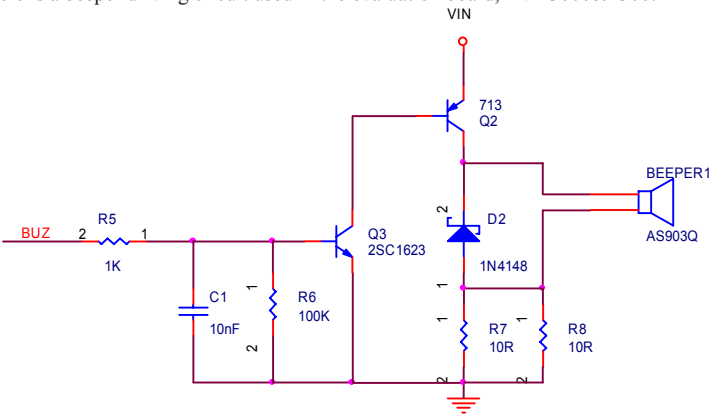
Beeper Output

Table below is the definitions of the beeper outputs:

Beep Pattern	Definitions
Low-higher-higher-higher	Power ON completed
1 beep	Successful reading of an ordinary barcode
2 beeps	Successful reading of an programming barcode
3 short low-2 high	Reading failure
1 long low	Unknown Character, Virtual Keypad (USB connection)

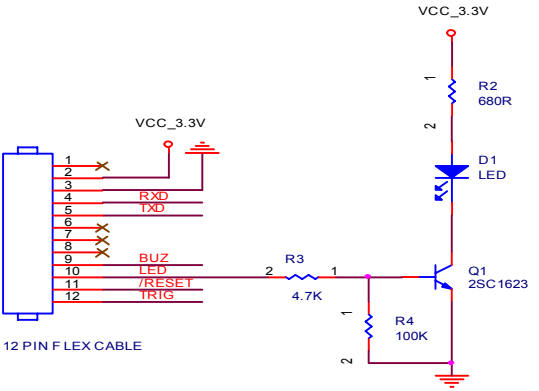
A Sample Schematic of Beeper Driving Circuit:

Here is a beeper driving circuit used in the evaluation board, EVK3000&1300.



A Sample Schematic of LED Driving Circuit:

Here is the LED driving circuit used in the evaluation board, EVK3000&1300.



Software Interface

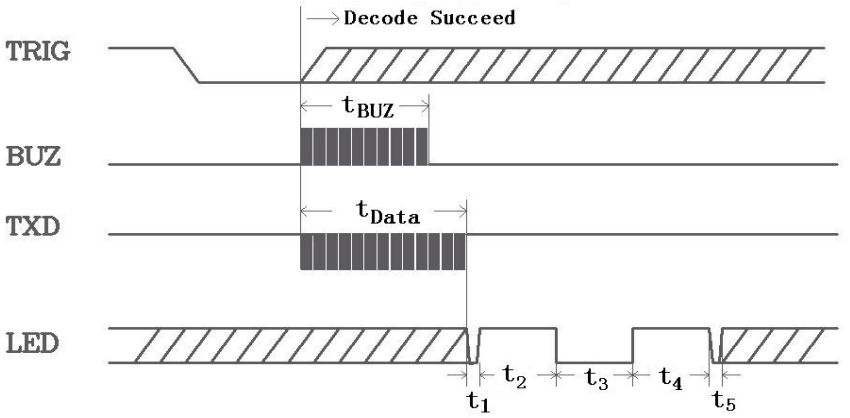
Introduction

The simpliest way to interface with EM3000 is to just listen to the serial output from the Engine. Leave the trigger, reset, beeper, and LED signals to the hardware. With proper configuration, the default firmware will send the decoded barcode messages through the serial output. However, if more controls of the Engine are required, the rest of this section describes the software interface with the Engine.

EM3000 will start a reading when the trigger Pin of the flexible cable is pulled low (hard trigger) or when EM3000 is in the sensor mode and it senses the trigger condition is met (sensor scan).

Hard Trigger

If the trigger line is connected to an output port of external device, the control software of the external device (Host) can pull the line low. The Engine will start to read barcode after 10 ms. The engine will keep reading until it read a barcode.



Read Timing Diagram

Mark	Definition	Time
tBUZ	Beeper Pulse Time	80ms
tData	Data Uploading Time	Determined by data length and baud rate
t1	Delay 1	1 ms
t2	Delay 2	50 ms
t3	Delay 3	50 ms
t4	Delay 4	50 ms
t5	Delay 5	1 ms

Auto Scan

The Engine can be in Auto mode. (See Configuration section for detail.) When the ambient light changes, the Engine will automatically make a read. If a valid read is found, the default function is to send the decoded barcode messages.

Continuous Scan Mode

Another scan mode is continuous scan mode. When the Engine is in this mode, it will keep acquiring images and trying to read a code. When it reads a code, it sends the code to the serial port.

This section introduces the serial communication. The default serial port configuration is baud rate of 9600, 8 data bits, no parity bit, and 1 stop bit. It is important to match the serial port configuration between EM3000 and the Host. Both EM3000 and Host can initiate communication.
Here are some conventions used in this section:

0xHH	A hexadecimal number. For example, 0xAB and 0x1234 are hexadecimal values of 171 and 4660, respectively.
<xxx>	ASCII control character. For example, <ACK> and <NAK> means ASCII control characters, 0x06 and 0x15, respectively.
“…” or ‘…’	ASCII String. For example, “AUTO-ID” and ‘AUTO-ID’ means same ASCII string, AUTO-ID.

EM3000 Initiated Data Upload

EM3000 initiates communication only to send system information on power on, when enabled, and barcode messages. No reply from Host is expected.

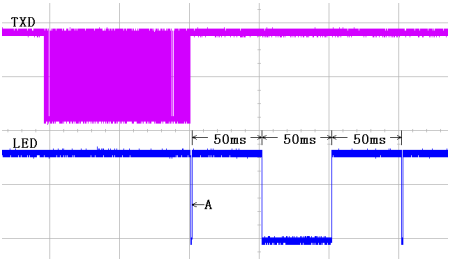
The message upload format is in binary. It is the binary value of the decoded barcode value including prefix, suffix, and so on.

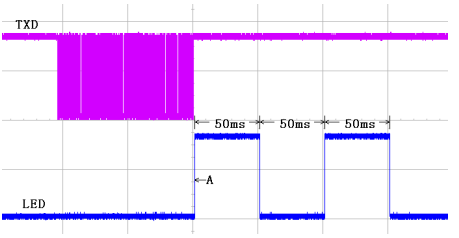
There are three methods to determine the end of barcode message.

Method 1: LED Signal

If a valid reading is found, the default function is to send a PMW signal to BUZ line and the decoded barcode message will be sent through the serial out line.

After the barcode message is transmitted, the LED line will be pulled low for 1ms, then high for 50ms, low for 50ms, high for 50ms in turn. Finally it will be pulled low for 1ms as end. EM3000's application program controls LED signal level. If prgram enables LED, the signal level will go as shown in the left diagram below. If disables, it will go as shown in the right diagram below. To start next reading, the trigger line must be pulled high before next trigger to read.





Suggestion: If LED signal is used to decide if a reading is successful, please use LED positive edge interrupt. Positive edge A is as shown in diagrams above. And the programs in the Host should watch and store the data through by serial port in cache. When positive edge A appears in LED signal, data has been transmitted. Now the Host should decide if data is stored. If yes, it must be a complete barcode message. It should be transmitted to the Host as soon as possible. If no, please go on reading.

Method 2: Inter-Character Timeout

Host could use inter-character timeout to determine the end of data upload. An inter-character timeout means the longest delay time between 2 consecutive (binary) characters in a sequence of (binary) characters sent over serial line. It is usually enabled only after the first character is received to avoid unwanted timeout events during the waiting of a message.

The inter-character timeout value should be set to about 5 times of a character’s transmission time. When the inter-character timeout occurs, it is the end of data upload. For example, 5 ms can be used as an inter-character timeout for the baud rate of 9600, 8 data bit, no parity bit, and one stop bit.

Method 3 : Message packing

Message pack uses framing protocol format. Factory default has message pack disabled. More detail about message Pack option is in next chapter.

Host can initiate following commands.

1. Are-You-There Command

This command is to query RS232 connection between the Host and EM3000.

Host Command	'?' (or 0x3F)	
EM3000 Reply		'!' (or 0x21)

2. Pro CMD Commands

This set of commands are to configure the Engine. To confirm that a command is properly executed, use query command to retrieve the actual value in EM3000.

2.1. Pro CMD Format

Host can send Pro CMD command following prefix, "NLS" (all upper case) or "nls" (all lower case). A Pro CMD command consists of command code and optional equal sign, '=', and command parameter:

"nls" + Command Code [+ '=' + parameter]

The Pro CMD command is an ASCII string. The parameter can be decimal, such as 9876, hexadecimal, such as 0x0a0d, or ASCII string, such as ''"AUTO-ID"'.

NOTE: The double quotes in the ASCII string are part of the parameter, not the convention for ASCII string. The Engine uses them to know the beginning and the end of string parameter.

Upon receiving Pro CMD command(s), the Engine will reply a <ACK>, 0x06, or <NAK>, 0x15 within 500 ms. The Engine replies <ACK> when command is correct; otherwise, it replies <NAK>.

2.2. Sample Pro CMD Commands

This Pro CMD command sets the Engine in auto (sensor) reading mode: "NLS0302010".
This setting command sets sensitivity value of the auto reading mode to 10:
"NLS0312040=10".
This setting command set the user defined prefix to AUTO-ID: nls0300000="AUTO-ID"
More Pro CMD commands are in Programming the Engine chapter.

3. Query Commands

Host uses query command to query data from the Engine. The maximum delay of the Engine’s reply is 500 ms.

3.1 The Query Command Format:

The format of query Command Format:

Command Prefix		Lens		Data1			LRC
0x7E	0x00	Len Hi	Len Low	Data 1	….	Data N	LRC

Where:

Command Prefix – A two-byte prefix field. Always 0x7E, 0x00.

Lens – A two-byte length field. The total number of bytes in Data Type field and Data1field.
Len Hi is the high (most significant) byte of the Lens field. Len Low is the low byte of the field.

Data1 – Command dependent Data1 field. Maximum size is 32 bytes.

LRC – A one-byte LRC field.
LRC = 0xFF xor Len Hi xor Len Low xor Type xor Data1.

3.2. The Query Reply Format:

Reply Prefix		Lens		Data Type	Data1			LRC
0x02	0x00	Len Hi	Len Low	0x34	Data 1	….	Data N	LRC

Where:

Reply Prefix – A two-byte prefix field. Always 0x02, 0x00.

Lens – A two-byte length field. The total number of bytes in Data Type field and Data1field.
Len Hi is the high (most significant) byte of the Lens field. Len Low is the low byte of the field.

Data Type – Always 0x34 for reply.

Data1 – Command dependable Data1 field. Maximum size 32 bytes.

LRC – A one-byte LRC field.
LRC = 0xFF xor Len Hi xor Len Low xor Type xor Data1.

3.3. Sample Query Command

Here is a sample of query command for ESN:

Command Prefix		Lens		Data1					LRC
0x7E	0x00	0x00	0x05	0x33	0x48	0x30	0x32	0x30	0xB3

Where
Data1 = '3H020'
LRC = 0xFF xor 0x00 xor 0x05 xor 0x33 xor 0x48 xor 0x30 xor 0x32 xor 0x30 = 0xB3.

Engine Reply:

Reply Prefix		Lens		Data Type	Data1			
0x02	0x00	0x00	0x12	0x34	0x30	0x32	0x31	0x33

Data 1									
0x53	0x57	0x30	0x35	0x38	0x33	0x38	0x33	0x4B	0x48

Data1			LRC
0x2D	0x35	0x36	0xF5

Where
Data1 = '0213SW058383KH-56'
The meaning of the reply is that the ESN is SW058383KH-56.
See Appendix A for more detail.

4. Image Upload

The image captured in EM3000 can be uploaded to Host. The image is gray scale of the size of 752x480 pixels.
Image Upload Command:

Command Prefix		Lens		Data1		LRC
0x7E	0x00	0x00	0x03	Ratio	0x00	lrc

Where
Ratio = 0x00 for 1:1 upload, i.e. upload 752x480 pixels, lrc=0x80
0x01 for 1:4 upload, i.e., upload 376x240 pixels, lrc=0x81
0x02 for 1:16 upload, i.e. upload 188x120 pixels, lrc=0x82

Image Reply Format:
EM3000 uploads the image data as binary data. The data sequence are:
For 1:1 ration: pixel[0,0], ⋯, pixel[0,751],
pixel[1,0], ⋯, pixel[1,751],
⋯
pixel[479,0], ⋯, pixel[479,751]

For 1:4 ration: pixel[0,0], ⋯, pixel[0,375],
pixel[1,0], ⋯, pixel[1,375],
⋯
pixel[239,0], ⋯, pixel[239,375]

For 1:16 ration: pixel[0,0], ⋯, pixel[0,187],
pixel[1,0], ⋯, pixel[1,187],
⋯
pixel[119,0], ⋯, pixel[119,187].

5 Application Development and Download

Visual DSP++ is used for EM3000 application development. It should be installed first. The EM3000 SDK comes with all the necessary files and the default application project, app.dpj. The developer should study the default application, build the default application, download the newly built default application, and test the Engine. It is highly recommended that the developer modify from the default application instead of creating a new project from scratch.

A download program, Upgrade.exe, can be found in the SDK package. The program is for application download.

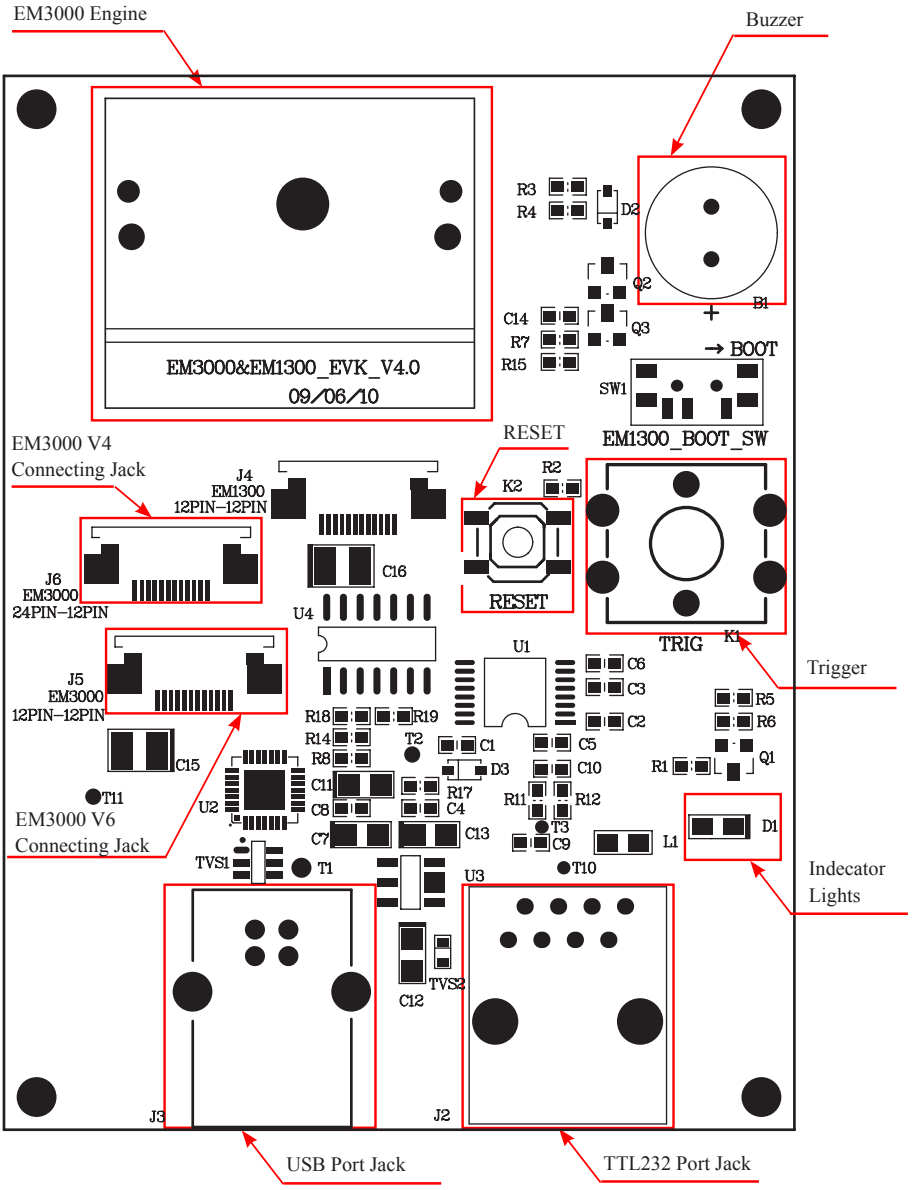
For more detail, see EM3000 SDK documents.

Development Tools

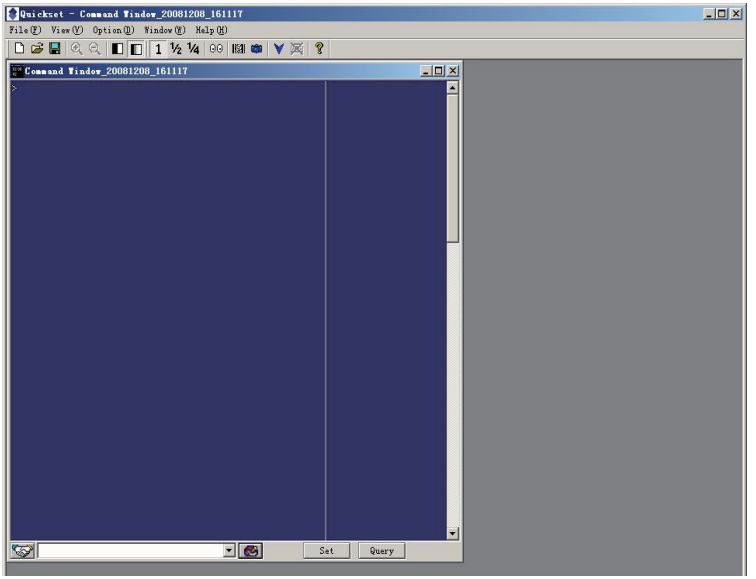
Introduction

This section lists some EM3000 development tools. A brief introduction to each tool is included.

Here is a brief introduction to the EM3000 Evaluation Kit, EKV3000&1300. The layout of the EVK3000&1300 circuit board is shown in figure below. The board contains beeper, LED, trigger button, and reset button. A USB connector is for the power and communication. An alternative TTL232 is for communication. The J1 connector is where the EM3000 flexible cable connects to.



QuickSet is a Windows based GUI program for Newland Auto-ID barcode readers. It can be used in development and for programming EM3000 and troubleshooting. The Host may implement some functions of QuickSet for the equipments or systems.



Software Development Kit

A software development kit is available for all EM series embedded engines. It allows Customers to develop their applications in EM series engines.

Programming the Engine

Introduction

There are 3 ways to program (configure) the Engine, Code Programming, Command Programming, and QuickSet Programming.

Code Programming

The Engine reads a set of specially encoded barcodes to program features. In the following sections, we will explain the options and features available and provide the barcodes to program them.

This method of programming the Engine is most straight forward. However, it requires manually readings of each barcode. As all manual operations, errors are more likely to occur.

Command Programming

The Host can send the Pro CMD strings (see the chapter of Software Interface) to program the Engine. In the following sections, the Pro CMD strings will be included with the barcodes for Code Programming.

A fixture, such as EVK3000 or other simplier circuit board, could be used to program the Engines before they are installed into your equipments or systems. Another alternative is to design the configuration capability in your equipments or systems.

This method of programming the Engine could be automated. A software program can be developed to download all the configuration data to the Engine.

QuickSet Programming

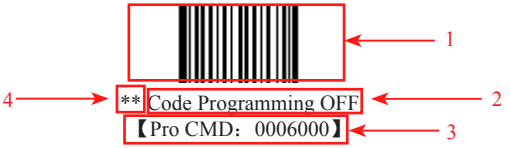
QuickSet is a Windows based GUI program for Newland Auto-ID bar code readers. It displays decoded data and captured images. The engine with its circuit board can be easily configured through the interface of QuickSet.

This method of programming the Engine is similar as the Command Programming. QuickSet is a software program developed for Newland Auto-ID products .

Note: The programming results are restored in non-volatile memory. They will not be lost when the Engine is powered off.

Code Programming ON

Code Programming OFF



This is the notation to disable the Code Programming.

There are 4 parts of a notation:

1、The first part of the notation is the barcode for Code Programming

2、The second part of the notation is the name of the options or features, such as Disable Code Programming.

3、The third part of the notation is the corresponding Pro CMD string of the Code Programming.

4、If there is “**” in front of the name, it means the notation is factory default.

Code Programming ON

Read the “Code Programming ON” barcode to activate “Code Programming” function. One or more Code Programming barcodes can be read to configure the Engine.
If an option or feature needs additional parameters, such as digits, they can be found at the end of this chapter.
To exit Code Programming, read “Code Programming OFF” or any normal barcode.

Code Programming OFF

** Code Programming OFF
【Pro CMD：0006000】

Code Programming ON
【Pro CMD：0006010】

The value of code programming can be sent to the Host. For factory default, “No Send Pro Code Value”, the value of programming codes will not be sent to the Host; by reading “Send Pro Code Value”, the reader will send the value of Programming Code to the Host.

**No Send Pro Code Value
【Pro CMD：0002000】

Send Pro Code Value
【Pro CMD：0002010】

Illumination LED lighting up barcodes are used to capture better images. There are 4 modes:

Code Programming ON

Code Programming OFF

» “Illumination Wink”: LED keeps flashing when reading
» “Illumination Keep ON”: LED keeps on when Power ON
» “Illumination Read ON”: LED keeps on when reading
» “Illumination OFF”: LED is off all the time

** Illumination Wink
【Pro CMD：0200000】

Illumination Read ON
【Pro CMD：0200030】

Illumination Keep ON
【Pro CMD：0200010】

Illumination OFF
【Pro CMD：0200020】

There are 3 modes:

- » “Aim Wink”: LED keeps flashing when reading
- » “Aim Keep ON”: LED keeps on when Power ON
- » “Aim OFF”: LED is off all the time
- » “Sense Mode”: LED is off when reading, on when not reading.

Code Programming ON

Code Programming OFF

** Aim Wink
【Pro CMD：0201000】

Aim Keep ON
【Pro CMD：0201010】

Aim OFF
【Pro CMD：0201020】

Sense Mode
【Pro CMD：0201030】

Decoding Beep

Read “Beep ON” to enable all decoding beep denotation and read “Beep OFF” to disable.

Code Programming ON

Code Programming OFF

**Beep ON
【Pro CMD：0203010】

Beep OFF
【Pro CMD：0203000】

Decoding Beep Type

**Type 1
【Pro CMD：0203020】

Type 2
【Pro CMD：0203021】

Type 3
【Pro CMD：0203022】

Code Programming ON

Code Programming OFF

Decoding Beep Volume

** Loud
【Pro CMD：0203030】

Low
【Pro CMD：0203032】

Medium
【Pro CMD：0203031】

Power On Beep

** Beep On
【Pro CMD：0204001】

Beep OFF
【Pro CMD：0204000】

Beep Denotation (Beeper Definitions)

Beep	Denotation
low-higher-higher-higher	Power ON completed
1 beep	successful reading of an ordinary barcode
2 beeps	successful reading of an programming barcode
3 short low-2 high	reading failure
1 long low	Unknown Character, Virtual Keypad (USB connection)

» Hand-held Mode: Pull and keep holding the trigger line to read. Complete one reading or release the trigger to terminate reading status.

» Auto Mode: The ambient luminance change in front of the engine automatically initiates reading. After completion of reading, the engine goes to idle. Both luminance change and the Trigger can initiate reading when idle.

» Continuous Mode: Pull the Trigger line low to start reading. The engine will keep reading. To stop, pull trigger line low again.

Code Programming ON

Code Programming OFF

**Hand-held Mode
【Pro CMD：0302000】

Auto Mode
【Pro CMD：0302010】

Continuous Mode
【Pro CMD：0302020】

One Reading Timeout：If the engine doesn't read any barcode during the timeout period, it will stop reading automatically. One Reading Timeout is valid in Auto mode. The default timeout is 3000ms.

Same Barcode Reading Delay：It is used to avoid misreading on the same barcode (the same format and message) in a Same Barcode Reading Delay Time. It is valid only in Auto mode. The default delay is 1500ms.

Code Programming ON

Code Programming OFF

One Reading Timeout
【Pro CMD：0313000】

Same Barcode Reading Delay
【Pro CMD：0313010】

There are two options available in Same Barcode Reading Delay:

» (Multi-reading) Prohibit: The same symbol can be read after delay.

» (Multi-reading) Semi-prohibit: The same symbol can be read more than once in the delay period if ambient illumination is changed, for example the bar code is removed out of reading area and moved back.

** Multi-reading Semi-prohibit
【Pro CMD：0313020】

Multi-reading Prohibit
【Pro CMD：0313030】

Example

To set One Reading Timeout to 1500ms, read these programming codes:

1、“Code Programming ON”
2、“One Reading Timeout”
3、Digit Code “1”,“5”,“0”,“0”, see Digit Code
4、“Save Programming”

» Sensitivity is how sensitive the engine is to ambient illumination change.

» Sensitivity value is [1 .. 20]

» The lower the sensitivity value is the higher sensitivity will be. The lower the sensitivity value is the smaller illumination change will initiate reading.

Code Programming ON

Code Programming OFF

High Sensitivity (= 8)
【Pro CMD：0312020】

Enhanced Sensitivity (= 5)
【Pro CMD：0312030】

** Normal Sensitivity (= 11)
【Pro CMD：0312010】

Program Sensitivity
（Min:1, Max:20)
【Pro CMD：0312040】

Low Sensitivity (= 14)
【Pro CMD：0312000】

Code Programming ON

Code Programming OFF

** Normal Exposure Mode
【Pro CMD：0321000】

Reflections Eliminating Mode
【Pro CMD：0321010】

Factory Default

Code Programming ON

Read “Load All Factory Default” to reset all parameters to factory default.

Applicable conditions:

» User options programming wrong configuration leads to reading malfunction

» Forget details of previous programming and start over.

Code Programming OFF

**Load All Factory Default
【Pro CMD：0001000】

User Default

All user options can be saved as User Default. It will be restored in non-volatile memory.
Read “Save as User Default” to save all the current user options to be User Default, and erase the previous User Default. Read “Load User Default” to restore the engine to User Default.

Save as User Default
【Pro CMD：0001150】

Load User Default
【Pro CMD：0001160】

TIPS

If read “Load All Factory Default”, User Default will still be restored in non-volatile memory.

Query Product Information

Tools

Code Programming ON

Product information could be obtained by reading "Query Product Information" barcode. The engine will send it to the Host immediately.
“Power ON, Send Product Info”, the engine sends product information through serial port(only) to the Host after Power ON.

Code Programming OFF

Query Product Information
【Pro CMD：0003000】

**Power ON, Do not Send Product Info
【Pro CMD：0007000】

Power ON, Send Product Info
【Pro CMD：0007010】

The product information is provided as follows:

Title	Remarks
Firmware Ver	Device Firmware Version
Build Time	Device Firmware Version Establishing Time
Device ID	Device Type
App Ver	Device Application Version
uIMG Ver	Device uIMG Version
Date	Device Manufacture Date
S/N	Device serial number
ESN	User-defined device serial number
Manufacture ID	Device Name
Interface	1 types of communication interfaces: TTL232(EM3000) or RS232(EM2027), baud rate, parity check, data bits, stop bit
1D	Indicate that reading 1D is allowed. Symbols are divided by comma. Additional features format: 1. “+” connect features 2. Min Message Length -> Max Message Length 3. “No Check Digit” or “Check Digit” 4. “Fixed Length: 2~64 even value”. It is in this format: Fixed Length: 2 4 6 8 10 12...
2D	Indicate that reading 2D is allowed. Symbols are divided by comma. Additional feature format: Min Message Length -> Max Message Length
Scan Mode	Scan Mode: 1. Manual Scan 2. Auto Scan 3. Continuous Scan

RS232 Interface

Introduction

Under RS232 connection, the engine and the Host use the same communication parameters: baud rate, parity check, data bits select and stop bits select.

Enable RS232 Connection
【Pro CMD：1100000】

Code Programming ON

The engine and the Host should use the same serial port parameters: baud rate, parity check, data bits and stop bits. The sequence is as follows: 9600 (baud rate), null (parity check), 8 (data bits), 1 (stop bits).

Baud Rate

Code Programming OFF

Baud rate is the number of bits of data transmitted per second. Set your scan engine baud rate to match the baud rate setting of the Host device. Otherwise, they can not communicate.

The engine supports the following baud rates (The default baud rate is 9600):

**9600
【Pro CMD：0100030】

19200
【Pro CMD：0100050】

1200
【Pro CMD：0100000】

38400
【Pro CMD：0100060】

2400
【Pro CMD：0100010】

57600
【Pro CMD：0100070】

4800
【Pro CMD：0100020】

115200
【Pro CMD：0100080】

14400
【Pro CMD：0100040】

Code Programming ON

Parity Check

Parity check options should be the same on the engine and the Host.

» Select Odd parity: If data has an odd number of 1 bits, the parity bit value is set to 0.

» Select Even parity:If data has an even number of 1 bits, the parity bit value is set to 0.

» Select No Parity Check and parity bit will not be sent.

Code Programming OFF

**No Parity Check
【Pro CMD：0101000】

Odd Check
【Pro CMD：0101020】

Even Check
【Pro CMD：0101010】

Hardware Auto Flow Control（only for HR200）

When enabled，HR200 will decide if the data should be sent in accordance with CTS signal level. When it is low level CTS signal, it means the serial port’s cache memory of receiving end (such as PC) is full and HR200 will not send data through RS232 until CTS signal is set to high level by receiving end.
When HR200 is not ready for receiving, it will set RTS signal to low level. When sending end (such as PC) detects it, it could not send data to HR200 any more, otherwise the data will be lost.

When disabled, data’s sending and receiving through serial port will not be effected by RTS/CTS signal.

**Disable Hardware Auto Flow Control
【Pro CMD：0104000】

Enable Hardware Auto Flow Control
【Pro CMD：0104010】

Before enabling this function, please be sure that RTS/CTS signal line is contained in RS232 cable. If not, a RS232 communication error will occur.

Data Bits Transmitted

Code Programming ON

Select data bits transmitted to be 5, 6, 7 and 8. Ensure the selections on the engine and the Host are the same.

Code Programming OFF

** 8 Data Bits
【Pro CMD：0103030】

6 Data Bits
【Pro CMD：0103010】

7 Data Bits
【Pro CMD：0103020】

5 Data Bits
【Pro CMD：0103000】

Stop Bits

Stop bit follows every byte to indicate the end of transmission and the start of the next transmission.
Default 1 stop bit.

**1 Stop Bits
【Pro CMD：0102000】

2 Stop Bits
【Pro CMD：0102010】

Symbols

Introduction

This chapter lists all the available symbols and provides the programming barcodes to enable/disable them.

Disabling reading of the symbols which do not apply, will improve reading performance. The few abling reading of the symbols are, the fast the engine will work.

Code Programming ON

Code Programming OFF

Disable Reading All

Disable Reading All = Allow reading Programming Codes only.

Disable Reading All
【Pro CMD：0001010】

Enable Reading All

Enable Reading All = Enable to read all symbols and Programming Codes.

Enable Reading All
【Pro CMD：0001020】

Enable Reading All 1D

Enable Reading All 1D
【Pro CMD：0001040】

Disable Reading All 1D

Disable Reading All 1D
【Pro CMD：0001030】

Code Programming ON

Code Programming OFF

Enable Reading All 2D

Enable Reading All 2D
【Pro CMD：0001060】

Disable Reading All 2D

Disable Reading All 2D
【Pro CMD：0001050】

Load Factory Default

Code Programming ON

Code Programming OFF

** Load Code 128 Factory Default
【Pro CMD：0400000】

Enable/Disable Code 128

Disable Code 128
【Pro CMD：0400010】

** Enable Code 128
【Pro CMD：0400020】

When the engine can not read Code 128, please read “Enable Code 128” and try again.

Select Message Length

It is used to program the valid reading length of Code 128. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.

Code 128 Message Length is defined by “Min. Message Length” and “Max. Message Length”.

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0400030】

Max Message Length (default: 48)
【Pro CMD：0400040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Code 128 to 8 bytes and Max Message Length to 12 bytes, read these programming codes

1、“Code Programming ON”
2、“Select Min Message Length”
3、Digit Code “8”, see Digit Code
4、“Save Programming”,see Digit Code
5、“Select Max Message Length”
6、Digit Code “1”
7、Digit Code “2”
8、“Save Programming”
9、“Code Programming OFF”

Code Programming ON

Code Programming OFF

Load Factory Default

** Load UCC/EAN-8 Factory Default
【Pro CMD：0401000】

Enable/Disable UCC/EAN-8

** Enable UCC/EAN-8
【Pro CMD：0401020】

Disable UCC/EAN-8
【Pro CMD：0401010】

Check Digit

UCC/EAN-8 is fixed 8 digits barcode and the last digit is check digit.

**Transmit Check
【Pro CMD：0401040】

Do Not Transmit Check
【Pro CMD：0401030】

Code Programming ON

Code Programming OFF

2 Digits Addenda Code

Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 2 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 2 digits Addenda Code.

** Disable 2 Digits Addenda Code
【Pro CMD：0401050】

Enable 2 Digits Addenda Code
【Pro CMD：0401060】

5 Digits Addenda Code

5 Digits Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 5 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 5 digits Addenda Code.

** Disable 5 Digits Addenda Code
【Pro CMD：0401070】

Enable5 Digits Addenda Code
【Pro CMD：0401080】

TIPS

“ Enable 2 Digits Addenda Code “ — read an ordinary code and 2 digits Addenda Code.
“ Enable 5 Digits Addenda Code “ — read an ordinary code and 5 digits Addenda Code.
“Disable 2 Digits Addenda Code “ — read an ordinary code only, and ignore 2 digits Addenda Code.

EAN-8 expand to EAN-13

Expand EAN-8 to EAN-13, by adding 5 bytes of “0” to the left, and then transmit.

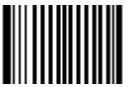
Code Programming ON

Code Programming OFF

** Do Not Expand to EAN-13
【Pro CMD：0401090】

Expand to EAN-13
【Pro CMD：0401100】

Load Factory Default



** Load EAN-13 Factory Default
【Pro CMD：0402000】

Code Programming ON

Code Programming OFF

Disable/EnableEAN-13

** Enable EAN-13
【Pro CMD：0402020】

Disable EAN-13
【Pro CMD：0402010】

Check Digit

** Transmit Check
【Pro CMD：0402040】

Do Not Transmit Check
【Pro CMD：0402030】

Code Programming ON

Code Programming OFF

2 Digits Addenda Code

Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 2 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 2 digits Addenda Code.

** Disable 2 Digits Addenda Code
【Pro CMD：0402050】

Enable 2 Digits Addenda Code
【Pro CMD：0402060】

5 Digits Addenda Code

5 Digits Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 5 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 5 digits Addenda Code.

** Disable 5 Digits Addenda Code
【Pro CMD：0402070】

Enable5 Digits Addenda Code
【Pro CMD：0402080】

TIPS

“ Enable 2 Digits Addenda Code “ — read an ordinary code and 2 digits Addenda Code.
“ Enable 5 Digits Addenda Code “ — read an ordinary code and 5 digits Addenda Code.
“Disable 2 Digits Addenda Code “ — read an ordinary code only, and ignore 2 digits Addenda Code.

Load Factory Default

** Load UPC-E Factory Default
【Pro CMD：0403000】

Code Programming ON

Code Programming OFF

Disable/Enable UPC-E

** Enable UPC-E
【Pro CMD：0403020】

Disable UPC-E
【Pro CMD：0403010】

TIPS When the engine can not read UPC-E, please read “Enable UPC-E” and try again.

Check Digit

UPC-E is fixed 8 digits barcode and the last digit is check digit.

** Transmit Check
【Pro CMD：0403040】

Do Not Transmit Check
【Pro CMD：0403030】

Code Programming ON

Code Programming OFF

2 Digits Addenda Code

Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 2 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 2 digits Addenda Code.

** Abort 2 Digits Addenda
【Pro CMD：0403050】

Enable 2 Digits Addenda Code
【Pro CMD：0403060】

5 Digits Addenda Code

5 Digits Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 5 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 5 digits Addenda Code.

** Disable 5 Digits Addenda Code
【Pro CMD：0403070】

Enable 5 Digits Addenda Code
【Pro CMD：0403080】

TIPS

“ Enable 2 Digits Addenda Code “ — read an ordinary code and 2 digits Addenda Code.
“ Enable 5 Digits Addenda Code “ — read an ordinary code and 5 digits Addenda Code.
“Disable 2 Digits Addenda Code “ — read an ordinary code only, and ignore 2 digits Addenda Code.

Code Programming ON

Code Programming OFF

Transmit Default “0”

The first byte of UPC-E is default to “0”.

** Do Not Transmit “0”
【Pro CMD：0403090】

Transmit “0”
【Pro CMD：0403100】

UPC-E Expand to UPC-A

Follow the standard algorithm to expand UPC-E to UPC-A.

**Do Not Expand to UPC-A
【Pro CMD：0403110】

Expand to UPC-A
【Pro CMD：0403120】

Code Programming ON

Code Programming OFF

Load Factory Default

** Load UPC-A Factory Default
【Pro CMD：0404000】

Disable/Enable UPC-A

** Enable UPC-A
【Pro CMD：0404020】

Disable UPC-A
【Pro CMD：0404010】

TIPS

When the engine can not read UPC-A, please read “Enable UPC-A” and try again.

Check Digit

UPC-A is fixed 13 digits barcode and the last digit is Check Digit.

**Transmit Check
【Pro CMD：0404040】

(Do) Not Transmit Check
【Pro CMD：0404030】

Code Programming ON

Code Programming OFF

2 Digits Addenda Code

Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 2 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 2 digits Addenda Code.

** Disable 2 Digits Addenda Code
【Pro CMD：0404050】

Enable 2 Digits Addenda Code
【Pro CMD：0404060】

5 Digits Addenda Code

5 Digits Addenda Code is the one to the right of an ordinary code. Picture below shows an ordinary code with a 5 digits Addenda Code. The left one in blue lines is an ordinary code. The right one in red lines is the 5 digits Addenda Code.

** Disable 5 Digits Addenda Code
【Pro CMD：0404070】

Enable 5 Digits Addenda Code
【Pro CMD：0404080】

TIPS

“ Enable 2 Digits Addenda Code “ — read an ordinary code and 2 digits Addenda Code.
“ Enable 5 Digits Addenda Code “ — read an ordinary code and 5 digits Addenda Code.
“Disable 2 Digits Addenda Code “ — read an ordinary code only, and ignore 2 digits Addenda Code.

Transmit Default “0”

The first byte of UPC-A is default to “0”.

Code Programming ON

Code Programming OFF

**Do Not Transmit “0”
【Pro CMD：0404090】

Transmit “0”
【Pro CMD：0404100】

UPC-A has the default “0” but it is not printed out, unlike UPC-E. Read “Transmit 0” will add a “0” to transmit.

Load Factory Default

Code Programming ON

Code Programming OFF

** Load Interleaved 2 of 5 Factory Default
【Pro CMD：0405000】

Disable/Enable Interleaved 2 of 5

** Enable Interleaved 2 of 5
【Pro CMD：0405020】

Disable Interleaved 2 of 5
【Pro CMD：0405010】

TIPS

When the engine can not read Interleaved 2 of 5, please read “Enable Interleaved 2 of 5” and try again

Select Message Length

Code Programming ON

Code Programming OFF

It is used to program the valid reading length of Interleaved 2 of 5. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.

Interleaved 2 of 5 Message Length is defined by “Min. Message Length” and “Max. Message Length”

Min Message Length (default: 6)
【Pro CMD：0405030】

Max Message Length (default: 80)
【Pro CMD：0405040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Interleaved 2 of 5 as 8 bytes, and Max Message length as 12 bytes, read these programming codes:

1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code Appendix (Pxxx)
4. “Save Programming”, see Digit Code Appendix (Pxxx)
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Interleaved 2 of 5 may include Check Digit (not compulsory) following its barcode messages. It verifies the barcode message.

» “NO Check, Transmit All” means to read without check and transmit all bytes including barcode message and Check digit.

» “Check, Do Not Transmit Check Digit” means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» “Check, Transmit All” means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

The number of Interleaved 2 of 5 barcode bits(check digit contained) must be even. If it is odd, a 0 will be added as the first digit. The check digit generates automatically when a barcode is produced.

** NO Check, Transmit All
【Pro CMD：0405050】

Check, Do Not Transmit Check Digit
【Pro CMD：0405060】

Check, Transmit All
【Pro CMD：0405070】

When “Check, Do Not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check Digit) Interleaved 2 of 5 with the Min Message Length being 4 bytes and “Check, Do Not Transmit Check digit” enabled leads to an error.

Specified Lengths

Program the engine to read specified lengths or ranges of specified lengths for Interleaved 2 of 5. The length value must be 3 decimal digits. And the length value MUST be an even number between 2 to 64.
Read “Enable Specified Length” to enable this feature or “Disable Specified Length” to disable.

Code Programming ON

Code Programming OFF

** Disable Specified Length
【Pro CMD：0405140】

Add Code Length
【Pro CMD：0405160】

Enable Specified Length
【Pro CMD：0405150】

Remove Code Length
【Pro CMD：0405170】

Example

The engine only read Interleaved 2 of 5 which are 12 and 24 bytes.
1. “Code Programming ON”
2. “Enable Specified Length”
3. “Add Code Length”
4. Digit Code “0”, “1”, “2”
5. “Save Programming”
6. “Add code length”
7. Digit Code “0”, “2”, “4”
8. “Save Programming”
9. “Code Programming OFF”

The engine only read Interleaved 2 of 5 between 12 bytes and 24 bytes.
1. “Code Programming ON”
2. “Enable Specified Length”
3. “Add Code Length”
4. Digit Code “0”, “1”, “2”
5. Digit Code “0”, “2”, “4”
6. “Save Programming”
7. “Code Programming OFF”

ITF-14 is a fixed length, 14 bytes Interleaved 2 of 5 barcode with Check digit. By factory default, it is disabled.

When enabled, ITF-14 precedes 14-byte Interleaved 2 of 5 barcode.

Code Programming ON

Code Programming OFF

**Disable ITF-14
【Pro CMD：0405080】

Enable ITF-14, Do Not Transmit Check Digit
【Pro CMD：0405090】

Enable ITF-14, Transmit Check Digit
【Pro CMD：0405100】

For instance, when ITF-14 is enabled and Interleaved 2 of 5 is disabled, the ITF-14 and 14 bytes Interleaved 2 of 5 with check digit can be read, but other Interleaved 2 of 5 can not.

Code Programming ON

ITF-6 is a fixed length 6 bytes Interleaved 2 of 5 barcode with check digit.
When enabled, ITF-6 precedes 6-byte Interleaved 2 of 5 barcode.

Code Programming OFF

**Disable ITF-6 User Selection
【Pro CMD：0405110】

ITF-6, Read, Do Not Transmit Check Digit
【Pro CMD：0405120】

ITF-6, Read, Transmit Check Digit
【Pro CMD：0405130】

For instance, when ITF-6 is enabled and Interleaved 2 of 5 is disabled, the ITF-6 and 6 bytes Interleaved 2 of 5 with check digit can be read, but other Interleaved 2 of 5 can not

Load Factory Default

Code Programming ON

** Load Code 39 Factory Default
【Pro CMD：0408000】

Code Programming OFF

Enable/Disable Code 39

** Enable Code 39
【Pro CMD：0408020】

Disable Code 39
【Pro CMD：0408010】

TIPS

When the engine can not read Code 39, please read “Enable Code 39” and try again

Transmit Start & Stop Character

Transmission of “*” can be selected.

**Transmit Both “*”
【Pro CMD：0408090】

Transmit Neither “*”
【Pro CMD：0408080】

Select Message Length

It is used to program the valid reading length of Code 39. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Code 39 Message Length is defined by “Min. Message Length” and “Max. Message Length “.

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0408030】

Max Message Length (default: 48)
【Pro CMD：0408040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Code 39 to 8 bytes, and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Code 39 may include Check Digit (not compulsory) following its barcode message. It verifies the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digit.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

** NO Check, Transmit All
【Pro CMD：0408050】

Check, Do not transmit Check Digit
【Pro CMD：0408060】

Check, Transmit All
【Pro CMD：0408070】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Code 39 with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Decode ASCII

Code 39 can include full ASCII characters. For factory default, the engine only decodes part of them. Read “Full ASCII decode” to decode full ASCII characters.

**Partial ASCII Decode
【Pro CMD：0408100】

Full ASCII Decode
【Pro CMD：0408110】

Load Factory Default

Code Programming ON

Code Programming OFF

** Load Codabar Factory Default
【Pro CMD：0409000】

Enable/Disable Codabar

** Enable Codabar
【Pro CMD：0409020】

Disable Codabar
【Pro CMD：0409010】

TIPS

When the engine can not read Codabar, please read “Enable Codabar” and try again.

Code Programming ON

Code Programming OFF

Select Message Length

It is used to program the valid reading length of Codabar. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.

Codabar Message Length is defined by “Min. Message Length” and “Max. Message Length “.

Min Message Length (default: 2)
【Pro CMD：0409030】

Max Message Length (default: 60)
【Pro CMD：0409040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Code Programming ON

Code Programming OFF

Check Digit

Codabar may include Check Digit (not compulsory) following its barcode message. It verifies the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digit.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

** NO Check, Transmit All
【Pro CMD：0409050】

Check, Transmit All
【Pro CMD：0409070】

Check, Do not transmit Check Digit
【Pro CMD：0409060】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Codabar with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Code Programming ON

Code Programming OFF

Transmit Start & Stop Character

Codabar uses either one of “A”, “B”, “C” and “D” as the start character and the stop character. Transmission of them can be selected.

**Transmit Both Start & Stop Character
【Pro CMD：0409090】

Transmit Neither Start & Stop Character
【Pro CMD：0409080】

**Use ABCD/ABCD As Start & Stop Character
【Pro CMD：0409100】

**Use Upper Letter
【Pro CMD：0409120】

Use ABCD/TN*E As Start & Stop Character
【Pro CMD：0409110】

Use Lower Letter
【Pro CMD：0409130】

Load Factory Default

Code Programming ON

** Load Code 93 Factory Default
【Pro CMD：0410000】

Code Programming OFF

Enable /Disable Code 93

** Disable Code 93
【Pro CMD：0410010】

Enable Code 93
【Pro CMD：0410020】

TIPS

When the engine can not read Code 93, please read “Enable Code 93” and try again.

Select Message Length

It is used to program the valid reading length of Code 93. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Code 93 Message Length is defined by “Min. Message Length” and “Max. Message Length .”

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0410030】

Max Message Length (default: 48)
【Pro CMD：0410040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Code 93 to 8 bytes and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Code 93 may include Check Digits (not compulsory) following its barcode message. The two digits verify the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digits.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

NO Check, Transmit All
【Pro CMD：0410050】

Check, Transmit All
【Pro CMD：0410070】

** Check, Do not transmit Check Digit
【Pro CMD：0410060】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Code 93 with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Code Programming ON

Load Factory Default

** Load UCC/EAN-128 Factory Default
【Pro CMD：0412000】

Code Programming OFF

Enable/Disable UCC/EAN-128

** Enable UCC/EAN-128
【Pro CMD：0412020】

Disable UCC/EAN-128
【Pro CMD：0412010】

TIPS

When the engine can not read UCC/EAN-128, please read “Enable UCC/EAN-128” and try again.

Load Factory Default

Code Programming ON

** Load GS1 Databar Factory Default
【Pro CMD：0413000】

Code Programming OFF

Enable/Disable GS1 Databar

** Enable GS1 Databar
【Pro CMD：0413020】

Disable GS1 Databar
【Pro CMD：0413010】

TIPS

When the engine can not read GS1 Databar, please read “Enable GS1 Databar” and try again.

Transmit AI(01) Character

** Transmit AI(01) Character
【Pro CMD：0413060】

Do not Transmit AI(01) Character
【Pro CMD：0413050】

Load Factory Default

Code Programming ON

** Load EAN·UCC Composite Factory Default
【Pro CMD：0414000】

Code Programming OFF

Enable/Disable EAN·UCC Composite

Enable EAN·UCC Composite
【Pro CMD：0414020】

** Disable EAN·UCC Composite
【Pro CMD：0414010】

Enable UPC/EAN Composite
【Pro CMD：0414040】

** Disable UPC/EAN Composite
【Pro CMD：0414030】

When the engine can not read EAN·UCC Composite, please read “Enable EAN·UCC Composite” and try again.

Load Factory Default

Code Programming ON

Code Programming OFF

** Load Code 11 Factory Default
【Pro CMD：0415000】

Enable/Disable Code 11

Enable Code 11
【Pro CMD：0415020】

** Disable Code 11
【Pro CMD：0415010】

When the engine can not read Code 11, please read “Enable Code 11” and try again.

Code Programming ON

Code Programming OFF

Select Message Length

It is used to program the valid reading length of Code 11. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Code 11 Message Length is defined by “Min. Message Length” and “Max. Message Length .”

Min Message Length (default: 4)
【Pro CMD：0415030】

Max Message Length (default: 48)
【Pro CMD：0415040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Code11 to 8 bytes and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Code 11 may include Check Digit (not compulsory) following its barcode message. It verifies the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digit.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

NO Check, Transmit All
【Pro CMD：0415050】

** Single Check Digit，MOD11
【Pro CMD：0415060】

Double Check Digits, MOD11/MOD11
【Pro CMD：0415070】

Double Check Digits, MOD11/MOD9
【Pro CMD：0415080】

Single Check Digit MOD11（Len <= 10)
Double Check Digits MOD11/MOD11 （Len > 10)
【Pro CMD：0415090】

Single Check Digit MOD11 （Len <= 10)
Double Check Digits MOD11/MOD9 （Len > 10)
【Pro CMD：0415100】

Do not transmit Check Digit
【Pro CMD：0415110】

** Transmit Check Digit
【Pro CMD：0415120】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Code 11 with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Load Factory Default

Code Programming ON

** Load ISBN Factory Default
【Pro CMD：0416000】

Code Programming OFF

Enable/Disable ISBN

Enable ISBN
【Pro CMD：0416020】

** Disable ISBN
【Pro CMD：0416010】

TIPS

When the engine can not read ISBN, please read “Enable ISBN” and try again.

Transmit

** Transmit 13 digits
【Pro CMD：0416030】

Transmit 10 digits
【Pro CMD：0416040】

Load Factory Default

Code Programming ON

Code Programming OFF

** Load Industrial 25 Factory Default
【Pro CMD：0417000】

Enable/Disable Industrial 25

Enable Industrial 25
【Pro CMD：0417020】

** Disable Industrial 25
【Pro CMD：0417010】

TIPS

When the engine can not read Industrial 25, please read “Enable Industrial 25” and try again.

Select Message Length

Code Programming ON

It is used to program the valid reading length of Industrial 25. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Industrial 25 Message Length is defined by “Min. Message Length” and “Max. Message Length .”

Code Programming OFF

Min Message Length (default: 6)
【Pro CMD：0417030】

Max Message Length (default:48)
【Pro CMD：0417040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Industrial 25 to 8 bytes and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Industrial 25 may include Check Digit (not compulsory) following its barcode message. It verifies the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digit.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

** NO Check, Transmit All
【Pro CMD：0417050】

Check, Transmit All
【Pro CMD：0417070】

Check, Do Not Transmit Check Digit
【Pro CMD：0417060】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Industrial 25 with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Load Factory Default

Code Programming ON

Code Programming OFF

** Load Standard 25 Factory Default
【Pro CMD：0418000】

Enable/Disable Standard 25

Enable Standard 25
【Pro CMD：0418020】

** Disable Standard 25
【Pro CMD：0418010】

TIPS

When the engine can not read Standard 25, please read “Enable Standard 25” and try again.

Select Message Length

Code Programming ON

Code Programming OFF

It is used to program the valid reading length of Standard 25. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Standard 25 Message Length is defined by “Min. Message Length” and “Max. Message Length .”

Min Message Length (default: 6)
【Pro CMD：0418030】

Max Message Length (default:48)
【Pro CMD：0418040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Standard 25 to 8 bytes and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Standard 25 may include Check Digit (not compulsory) following its barcode message. It verifies the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digit.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

** NO Check, Transmit All
【Pro CMD：0418050】

Check, Transmit All
【Pro CMD：0418070】

Check, Do Not Transmit Check Digit
【Pro CMD：0418060】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Industrial 25 with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Load Factory Default

Code Programming ON

** Load Plessey Factory Default
【Pro CMD：0419000】

Code Programming OFF

Enable/Disable Plessey

Enable Plessey
【Pro CMD：0419020】

** Disable Plessey
【Pro CMD：0419010】

When the engine can not read Plessey, please read “Enable Plessey” and try again.

Select Message Length

Code Programming ON

Code Programming OFF

It is used to program the valid reading length of Plessey. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Plessey Message Length is defined by “Min. Message Length” and “Max. Message Length .”

Min Message Length (default: 4)
【Pro CMD：0419030】

Max Message Length (default:48)
【Pro CMD：0419040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of Plessey to 8 bytes and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Plessey may include Check Digits (not compulsory) following its barcode message. The two digits verify the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digits.

» "Check, Do Not Transmit Check Digit" means to read and check. If verification is successful, transmits barcode message; if not, engine will not send barcode message to the Host.

» "Check, Transmit All" means to read and check. If verification is successful, transmits all messages; if not, engine will not send barcode message to the Host.

NO Check, Transmit All
【Pro CMD：0419050】

** Check, Transmit All
【Pro CMD：0419070】

Check, Do Not Transmit Check Digit
【Pro CMD：0419060】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) Plessey with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Load Factory Default

Code Programming ON

** Load MSI-Plessey Factory Default
【Pro CMD：0420000】

Code Programming OFF

Enable/Disable MSI-Plessey

Enable MSI-Plessey
【Pro CMD：0420020】

** Disable MSI-Plessey
【Pro CMD：0420010】

When the engine can not read MSI-Plessey, please read “Enable MSI-Plessey” and try again.

Select Message Length

Code Programming ON

Code Programming OFF

It is used to program the valid reading length of MSI-Plessey. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
MSI-Plessey Message Length is defined by “Min. Message Length” and “Max. Message Length .”

Min Message Length (default: 4)
【Pro CMD：0420030】

Max Message Length (default:48)
【Pro CMD：0420040】

TIPS

1D bar code Message Length should not exceed 127 bytes. If Max Message Length is less than Min Message Length, it means the engine will only support barcodes of the two lengths. If Max Message Length is equal to Min Message Length, the engine will only support barcodes of the length.

Example

To set Min Message Length of MSI-Plessey to 8 bytes and Max Message Length to 12 bytes, read these programming codes:
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”, see Digit Code
5. “Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Check Digit

Plessey may include Check Digits(s) (not compulsory) following its barcode message. It may have one or two digits, which verify the barcode message.

» "NO Check, Transmit All" means to read without check and transmit all bytes including barcode message and Check Digits.

NO Check, Transmit All
【Pro CMD：0420050】

Double Check Digits，MOD10/MOD11
【Pro CMD：0420080】

** Single Check Digit，MOD10
【Pro CMD：0420060】

NO Transmit Check Digits
【Pro CMD：0420090】

Double Check Digits，MOD10/MOD10
【Pro CMD：0420070】

** Transmit Check Digits
【Pro CMD：0420100】

When “Check, Do not Transmit Check digit” is enabled and barcode message length minus one is less than Min Message Length, it will lead to an error.
E.g.：Reading a 4-byte (include check byte) MSI-Plessey with the Min Message Length being 4 bytes and “Check, Do not transmit Check Digit” enabled leads to an error.

Load Factory Default

Code Programming ON

** Load PDF417 Factory
【Pro CMD：0501000】

Code Programming OFF

Enable/Disable PDF417

** Enable PDF417
【Pro CMD：0501020】

Disable PDF417
【Pro CMD：0501010】

When the engine can not read PDF417, please read “Enable PDF417” and try again.

Select Message Length

It is used to program the valid reading length of PDF417. The engine will not send barcode message to the Host, if the decoded data length does not match the valid reading length.
PDF417 Message Length is defined by "Min. Message Length" and "Max. Message Length ".

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0501030】

Max Message Length (default: 2710)
【Pro CMD：0501040】

TIPS

2D bar code Message Length should not exceed 65535 bytes.
Max Message Length should not be less than Min Message Length.
To read a fixed length PDF417, Please program Max & Min Message Length to the same value.

Example

To set Min Message Length of PDF417 to 8 bytes and Max Message Length to 12 bytes, read these programming codes:

1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. “Save Programming”,see Digit Code
5. “SelectMax Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

PDF417 Twin Code

PDF417 twin code is 2 PDF417 barcodes paralleled vertically or horizontally. They must have the same direction. Their specifications must be similar and the distance between them must be short.

There are 3 options for reading PDF417 twin code:

» Single PDF417 Only: Read either PDF417 code.

» Twin PDF417 Only: Read both PDF417 codes. The transmission sequence is: left (upper) PDF417 code followed by right (lower) PDF417 code.

» Both Single & Twin: Read both PDF417 codes. If successful, transmit as twin PDF417 only. Otherwise, try single PDF417 only.

** Single PDF417 Only
【Pro CMD：0501070】

Twin PDF417 Only
【Pro CMD：0501080】

Both Single & Twin
【Pro CMD：0501090】

Forward/Positive Direction PDF 417

PDF 417 has forward or positive direction.

Forward Direction Barcode：Light colour ground, Deep colour bars.
Positive Direction Barcode：Deep colour ground, Light colour bars.

** Forward Direction Barcode Only
【Pro CMD：0501320】

Positive Direction Barcode Only
【Pro CMD：0501321】

Both
【Pro CMD：0501322】

Load Factory Default

Code Programming ON

** Load QR Code Factory Default
【Pro CMD：0502000】

Code Programming OFF

Enable/Disable QR Code

** Enable QR Code
【Pro CMD：0502020】

Disable QR Code
【Pro CMD：0502010】

TIPS

When the engine can not read QR Code, please read “Enable QR Code” and try again.

Select Message Length

It is used to program the valid reading length of QR Code. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
QR Code Message Length is defined by "Min. Message Length" and "Max. Message Length ".

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0502030】

Max Message Length (default: 7089)
【Pro CMD：0502040】

TIPS

2D bar code Message Length should not exceed 65535 bytes.
Max Message Length should not be less than Min Message Length.
To read a fixed length QR Code, Please program Max & Min Message Length to the same value

Example

To set Min Message Length of QR Code to 8 bytes and Max Message Length to 12 bytes, read these programming codes:

1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. Save Programming”, see Digit Code
5. Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

QR Twin Code

QR twin code is 2 QR barcodes paralleled vertically or horizontally.They must have the same direction. Their specifications must be similar and the distance between them must be short.

There are 3 options for reading QR twin code:

» Single QR Only: Read either QR code.

» Twin QR Only: Read both QR codes. The transmission sequence is: left (upper) QR code followed by right (lower) QR code.

» Both Single & Twin: Read both QR codes. If successful, transmit as twin QR only. Otherwise, try single QR only.

Code Programming ON

Code Programming OFF

**Single QR Only
【Pro CMD：0502070】

Twin QR Only
【Pro CMD：0502080】

Both Single & Twin
【Pro CMD：0502090】

Load Factory Default

Code Programming ON

** Load Aztec Factory Default
【Pro CMD：0503000】

Code Programming OFF

Enable/Disable Aztec

Enable Aztec
【Pro CMD：0503020】

** Disable Aztec
【Pro CMD：0503010】

When the engine can not read Aztec, please read “Enable Aztec” and try again.

Select Message Length

It is used to program the valid reading length of Aztec. The engine will not send barcode message to the Host, if the decoded data length does not match the valid length.
Aztec Message Length is defined by “Min. Message Length” and “Max. Message Length “.

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0503030】

Max Message Length (default: 3832)
【Pro CMD：0503040】

TIPS

2D bar code Message Length should not exceed 65535 bytes.
Max Message Length should not be less than Min Message Length.
To read a fixed length Aztec, Please program Max & Min Message Length to the same value.

Example

To set Min Message Length of Aztec to 8 bytes and Max Message Length to 12 bytes, read these programming codes.
1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. Save Programming”, see Digit Code
5. Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Reading Multi-barcodes of an Image

There are three modes:

» Mode 1：Read one barcode only.

» Mode 2：Read fixed number of barcodes only.

» Mode 3：Composite Reading. Read fixed number of barcodes first, if failed, read one barcode only.

Code Programming ON

Code Programming OFF

** Mode 1
【Pro CMD：0503070】

Mode 2
【Pro CMD：0503080】

Mode 3
【Pro CMD：0503090】

The number of Multi-barcodes

Code Programming ON

Code Programming OFF

** 1
【Pro CMD：0503060】

5
【Pro CMD：0503064】

2
【Pro CMD：0503061】

6
【Pro CMD：0503065】

3
【Pro CMD：0503062】

7
【Pro CMD：0503066】

4
【Pro CMD：0503063】

8
【Pro CMD：0503067】

Load Factory Default

Code Programming ON

** Load Data Matrix Factory Default
【Pro CMD：0504000】

Code Programming OFF

Enable/Disable Data Matrix

** Enable Data Matrix
【Pro CMD：0504020】

Disable Data Matrix
【Pro CMD：0504010】

When the engine can not read Data Matrix, please read “Enable Data Matrix” and try again.

Select Message Length

It is used to program the valid reading length of Data Matrix. The engine will not send barcode message to the Host, if the decoded data length does not match the valid reading length.
Data Matrix Message Length is defined by "Min. Message Length" and "Max. Message Length ".

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0504030】

Max Message Length (default: 3116)
【Pro CMD：0504040】

TIPS

2D bar code Message Length should not exceed 65535 bytes.
Max Message Length should not be less than Min Message Length.
To read a fixed length Data Matrix, Please program Max & Min Message Length to the same value.

Example

To set Min Message Length of Data Matrix to 8 bytes and Max Message Length to 12 bytes, read these programming codes.

1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. Save Programming”, see Digit Code
5. Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

Code Programming ON

Code Programming OFF

Data Matrix Twin Code

Data Matrix twin code is 2 Data Matrix barcodes paralleled vertically or horizontally.They must have the same direction. Their specifications must be similar and the distance between them must be short.

There are 3 options for reading Data Matrix:

» Single Data Matrix Only: Read either Data Matrix.

» Twin Data Matrix Only: Read both Data Matrix. The transmission sequence is: left (upper) Data Matrix followed by right (lower) Data Matrix.

» Both Single & Twin: Read both Data Matrix. If successful, transmit as twin Data Matrix. Otherwise, try single Data Matrix only.

**Single Data Matrix Only
【Pro CMD：0504070】

Twin Data Matrix Only
【Pro CMD：0504080】

Both Single & Twin
【Pro CMD：0504090】

Rectangular Symbols

Code Programming ON

Data Matrix has two formats:

» Square symbols, which has the same amount of models in length and width： 10*10，12*12.... 144*144。

» Rectangular symbols, which has different amounts of models in length and width：6*16;6*14...14*22。

Code Programming OFF

** Enable Rectangular Symbols
【Pro CMD：0504110】

Disable Rectangular Symbols
【Pro CMD：0504100】

Forward/Positive Direction Data Matrix

Data Matrix has forward or positive direction.

Forward Direction Barcode：Light colour ground, Deep colour bars.
Positive Direction Barcode：Deep colour ground, Light colour bars.

** Forward Direction Barcode Only
【Pro CMD：0504320】

Both
【Pro CMD：0504322】

Positive Direction Barcode
【Pro CMD：0504321】

Load Factory Default

Code Programming ON

** Load Maxicode Factory Default
【Pro CMD：0505000】

Code Programming OFF

Enable/Disable Maxicode

Enable Maxicode
【Pro CMD：0505020】

** Disable Maxicode
【Pro CMD：0505010】

When the engine can not read Maxicode, please read “Enable Maxicode” and try again.

Select Message Length

It is used to program the valid reading length of Maxicode. The engine will not send barcode message to the Host, if the decoded data length does not match the valid reading length.
Maxicode Message Length is defined by "Min. Message Length" and "Max. Message Length ".

Code Programming ON

Code Programming OFF

Min Message Length (default: 1)
【Pro CMD：0505030】

Max Message Length (default:150)
【Pro CMD：0505040】

TIPS

2D bar code Message Length should not exceed 65535 bytes.
Max Message Length should not be less than Min Message Length.
To read a fixed length Maxicode, Please program Max & Min Message Length to the same value.

Example

To set Min Message Length of Maxicode to 8 bytes and Max Message Length to 12 bytes, read these programming codes.

1. “Code Programming ON”
2. “Select Min Message Length”
3. Digit Code “8”, see Digit Code
4. Save Programming”, see Digit Code
5. Select Max Message Length”
6. Digit Code “1”
7. Digit Code “2”
8. “Save Programming”
9. “Code Programming OFF”

OCR

Introduction

OCR (Optical Character Recognition) is the technology that captures image of printed information, and recognizes the image to editable characters.
The engine supports OCR B standard and specific typefaces, such as:

■ 0 1 2 3 4 5 6 7 8 ■

1. Nine numbers of OCR-B typeface must be included.
2. There must be a space between No.7 and No.8 number.
3. It must start and end with “■”. There must be a space between “■” and a number.

** Load SPEC_OCR_B Factory Default
【Pro CMD：0600000】

** Disable OCR
【Pro CMD：0600010】

Enable OCR
【Pro CMD：0600020】

Prefix/Suffix

Introduction

1D barcodes could contain digits, letters and symbols, etc. 2D barcodes could contain more data, such as Chinese characters and other multi-byte characters. However, in reality, they do not and should not have all the information we need, such as barcode type, date and time of scan, delimiter, and so on, in order to keep the code short and flexible.

Prefix and Suffix are how to fulfill the needs mentioned above. They can be added, removed, and modified while the original barcode message is still in tact.

Barcode processing sequences:

1. Intercept barcode message
2. Add Prefix/Suffix
3. Pack
4. Terminate with Stop Suffix and transmit

Disable or Enable Prefix/Suffix

Code Programming ON

Disable All Prefix/Suffix: Transmit barcode message with no Prefix/Suffix.

Enable All Prefix/Suffix: Allow appending Code ID prefix, AIM prefix, User prefix, User suffix and Stop suffix to the barcode message.

Code Programming OFF

** Disable All Prefix/Suffix
【Pro CMD：0311000】

Enable All Prefix/Suffix
【Pro CMD：0311010】

Prefix Sequences

6 options of Prefix Sequences:

Code Programming ON

Code Programming OFF

** CodeID + AIM + User Prefix
【Pro CMD：0317000】

AIM + User Prefix + CodeID
【Pro CMD：0317030】

CodeID + User Prefix + AIM
【Pro CMD：0317010】

User Prefix + CodeID + AIM
【Pro CMD：0317040】

AIM + CodeID + User Prefix
【Pro CMD：0317020】

User Prefix + AIM + CodeID
【Pro CMD：0317050】

Disable or Enable User Prefix

Code Programming ON

User Prefix is added before barcode message. For example, if the user prefix is “AB” and the barcode message is “123”, the Host receives “AB123”.

Code Programming OFF

** Disable User Prefix
【Pro CMD：0305000】

Enable User Prefix
【Pro CMD：0305010】

Program User Prefix

Enable “Program User Prefix”. Then program user prefix byte(s). To end the prefix, read “Save programming” The user prefix byte is programmed in its hex values. See example below.

Note: The maximum length for user prefix is 10 bytes.

Program User Prefix
【Pro CMD：0300000】

Example

Program “CODE” as user prefix (The hex of “CODE” are 0x43/0x4F/0x44/0x45):

1. Read “Code Programming ON”
2. Read “Program User Prefix”
3. Read “4,3,4,F,4,4,4,5” in order
4. Read “Save Programming”
5. Read “Code Programming OFF”.
6. Read “Allow User Prefix” to enable above programming. “CODE” will appear to the left of a barcode.

AIM Prefix

Tools

AIM (Automatic Identification Manufactures) defines AIM prefix for many standard barcode formats.

AIM Prefix Format: “]” + AIM prefix + “0”

Code Programming ON

Code Programming OFF

** Disable AIM Prefix
【Pro CMD：0308000】

Enable AIM Prefix
【Pro CMD：0308030】

AIM ID is not customizable.

Code ID Prefix

Tools

Besides AIM prefix, Code ID prefix can be used to denote barcode format and can be customized.

The Code ID prefix MUST be one (1) or two (2) visible English letters.

Code Programming ON

Code Programming OFF

** No Code ID Prefix
【Pro CMD：0307000】

Allow Code ID Prefix
【Pro CMD：0307010】

Code ID Default

All Bar codes, Load Code ID Factory Default
【Pro CMD：0307020】

Modify Code ID

See the examples below for how to modify a code ID and restore factory default code ID.

Code Programming ON

Code Programming OFF

Example

Modify PDF417 Code ID to be “p” (hex value is 0x70)
1. Read “Code Programming ON”
2. Read “Modify PDF417”
3. Read Digit Code “7”, “0”
4. Read “Save Programming”
5. Read “Code Programming OFF”.

Load Code ID factory default (including PDF417)
1. Read “Code Programming ON”
2. Read “2D, Load Code ID Factory Default”
3. Read “Code Programming OFF”.

Modify PDF417
【Pro CMD：0005000】

Modify Data Matrix
【Pro CMD：0005030】

Modify QR Code
【Pro CMD：0005010】

Modify Maxicode
【Pro CMD：0005040】

Modify Aztec
【Pro CMD：0005020】

User Define Code
【Pro CMD：0005090】

Code Programming ON

Code Programming OFF

Modify EAN-8
【Pro CMD：0004040】

Modify EAN-13
【Pro CMD：0004050】

Modify UPC-E
【Pro CMD：0004060】

Modify UPC-A
【Pro CMD：0004070】

Modify Interleaved 2 of 5
【Pro CMD：0004080】

Modify ITF-14
【Pro CMD：0004090】

Modify ITF-6
【Pro CMD：0004100】

Modify Code 39
【Pro CMD：0004130】

Modify Codabar
【Pro CMD：0004150】

Modify Code 93
【Pro CMD：0004170】

Code Programming ON

Code Programming OFF

Modify Code 128
【Pro CMD：0004020】

Modify UCC/EAN-128
【Pro CMD：0004030】

Modify Code 11
【Pro CMD：0004280】

Modify EAN•UCC Composite
【Pro CMD：0004300】

Modify GS1 Databar
【Pro CMD：0004310】

Modify ISBN
【Pro CMD：0004240】

Modify Industrial 25
【Pro CMD：0004250】

Modify Standard 25
【Pro CMD：0004260】

Modify Plessey
【Pro CMD：0004270】

Modify MSI-Plessey
【Pro CMD：0004290】

Disable or Enable User Suffix

Code Programming ON

User suffix is appended to the right of barcode message. For example, if user suffix is “AB”, and the barcode message is “123”, The Host receives “123AB”.

Code Programming OFF

**Disable User Suffix
【Pro CMD：0306000】

Enable User Suffix
【Pro CMD：0306010】

Program User Suffix

Read “Program User Suffix”. Then program user suffix byte(s). To end the suffix, read “Save programming”. The user suffix byte is programmed in its hex values. See example below.

Note: The maximum length for user suffix is 10 bytes.

Program User Suffix
【Pro CMD：0301000】

Example

Program “CODE” as user suffix (The hex of “CODE” are 0x43, 0x4F, 0x44, and 0x45):

1. Read “Code Programming ON”
2. Read “Program User Suffix”
3. Read “4,3,4,F,4,4,4,5” in order
4. Read “Save Programming”
5. Read “Code Programming OFF”
6. Read “Allow User Suffix” to enable above programming. “CODE” will appear to the right of a barcode.

Disable or Enable Stop Suffix

Code Programming ON

Code Programming OFF

“Stop Suffix” is the termination for a string of barcode messages. It can not be formatted like other suffix and prefix. It is fixed to the right and the very end of a barcode transmission.

**Disable Stop Suffix
【Pro CMD：0309000】

Enable Stop Suffix
【Pro CMD：0309010】

Program Stop Suffix

Read “Program Stop Suffix”. Then program stop suffix byte(s). To end the suffix, read “Save programming”. The stop suffix byte is programmed in its hex values. See example below.

Note: The maximum length for stop suffix is 2 bytes.

Program Stop Suffix
【Pro CMD：0310000】

Program Ox0D as Stop Suffix
【Pro CMD：0310010】

Program Ox0D 0x0A as Stop Suffix
【Pro CMD：0310020】

Message Interception & Pack

Introduction

Barcode message could divide information into different sections, such as product ID, manufacture ID, and so on. They are important overall. However, at certain situations, some of them are not of interest. This is where message interception comes in. Message interception feature allows transmission of selected section(s). Message intercept only applies to “raw” barcode messages.

The sequence of a read to transmit without message intercept is: Read a “raw” barcode —> Add prefix —> Append suffix —> Append stop suffix —> Transmit to Host.

The sequence of a read to transmit with message intercept is: Read a “raw” barcode —> Intercept Message —> Add prefix—> Append suffix —> Append stop suffix —> transmit to Host.

A special programming, pack, can insert barcode messages into a certain message format.

Then the processing sequence is: Read to obtain barcode message—> Intercept—> Add prefix—> Append suffix—> Pack—> Append stop suffix—>Transmit.

Code Programming ON

Code Programming OFF

Interception Rule No.1: It only intercepts selected symbols' raw barcode messages and it effects all barcodes of the barcode format.

Interception Rule No.2: There are maximum 3 interception options restored in the non-volatile memory. If more than 3 are programmed, the last 3 are stored. For example, if there are 4 options are programmed in the order of Code 128，Code 39，QR Code, and UPC-A and "Save". The 3 options are restored in the order of: Code 39，QR Code, UPC-A.

Interception Rule No.3: If there are more than one options programmed for a barcode format, the later one is used. For example, there are 3 options restored, Code 128 option A, QR Code option, Code 128 option B. The Code 128 option B is used when a Code 128 barcode is read.

**Disable Interception
【Pro CMD：0315000】

Enable Interception
【Pro CMD：0315010】

Program Intercept Option
【Pro CMD：0316000】

Erase Certain Barcode Interception Options
【Pro CMD：0316010】

Erase Latest Interception Options
【Pro CMD：0316020】

Erase All Interception Options
【Pro CMD：0316030】

Code Programming ON

Code Programming OFF

Programming 1D Intercept Option

When programming 1D intercept option, read digit codes as interception command. The rules is as below：

» The interception command format of 1D interception command regards a 3-digit decimal number as a unit.

» The interception command has two parts, which are barcode type part(Symbol ID) and data interception part. A command could have several data interception parts.

» A barcode type part(Symbol ID) uses a unit, such as “005”; a datainterception part uses three units, including intercepting direction unit:000(Ascending) or 001(Descending), start unit and stop unit.

» There is only one type of barcode to be setted to intercept in a time.

Example

Intercept EAN-13 from 1st digit to 3rd ascending and from reciprocal 4th to reciprocal 1st:
1、Read “Code Programming ON”
2、Read “Allow Interception”
3、Read “Program Intercept Option”
4、Check Symbols ID Number table for EAN-13
5、Read below digit barcodes

digit	005	000	001	003	001	004	001
Denotes	symbol ID	ascending	the 1st digit	the 3rd digit	descending	the 4th digit	the 1st digit

Barcode Type　　Data Interception 1　　Data Interception 2

Note：

1、Maximum sections of barcode message interception are 5.

2、Maximum value is 127 for both start digital and end digital

3、Overlaps of barcode message sections are allowed and work independently.

4、Start unit and end unit determine its message section. In the above example, descending “004” and “001” means the section of “last 4th”, “last 3rd”, “last 2nd”, and “last one” digits.

5、To intercept only one digit, program start unit and end unit to be the same value.

Code Programming ON

Code Programming OFF

Programming 2D Intercept Option

When programming 2D intercept option, read digit codes as interception command. The rules is as below：

» The interception command has two parts, which are barcode type part(Symbol ID) and data interception part. A command could have several data interception parts.

» A barcode type part(Symbol ID) uses a unit, such as “005”; a data interception part uses three units, including intercepting direction unit:000(Ascending) or 001(Descending), start unit and stop unit.

» Barcode type part and intercepting direction regards a 3-digit decimal number as a unit; but start and stop digit regards a 6-digit decimal number as a unit. They uses 6 digits to present 4-digit value. The first two digits are for thousandth and next two digits for hundredth. For example, 001013 means 113.

» There is only one type of barcode to be setted to intercept in a time.

Example

For example, intercept QR Code from 1st digit to 20th ascending and from 113th digit to 140th ascending.

1. Read “Code Programming ON”
2. Read “Enable Interception”
3. Read “Program Intercept Option”
4. Check Symbols ID Number table for QR Code
5. Read below digit barcodes

digit	033	000	000001	000020	000	001013	001040
Denote	symbol ID	ascending	The 1st digit	The 20th digit	ascending	The 113th digit	The 140th digit

Barcode Type　　Data Interception 1　　Data Interception 2

Rules：

1、Maximum intercept 3 barcode message sections

2、Maximum value is 9999 for start digital and end digital

3、Overlaps of barcode message sections are allowed and work independently.

4、Start unit and end unit determine its message section. In the above example, ascending “000001” and “000020” means the first 20 digits.

5、To intercept only one digit, program start unit and end unit to be the same value.

Code Programming ON

Code Programming OFF

Introduction

Data Pack is for the special requirements of barcode message. There are 3 types of data pack. Data pack effects all data formats, in that be sure to load the default “Disable Pack” if pack is not required.

** Disable Pack
【Pro CMD：0314000】

Normal Pack

Normal pack format:：

[STX + ATTR + LEN] + [AL_TYPE + DATA] + [LRC]

» STX：0x02

» ATTR：0x00

» LEN：Barcode message length is expressed by 2 bytes, range “0x0000~0xFFFF” which is between 0 and 65535.

» AL_TYPE：0x36

» DATA：Barcode message

» LRC：Parity byte

The algorithm:

1、computation sequence is LRC=0xFF+STX+ATTR+LEN+AL_TYPE+DATA

2、computation method is XOR, byte by byte.

Normal Pack
【Pro CMD：0314010】

Batch Programming

Tools

Introduction

Batch Programming can integrate a programming sequence into one barcode.
Batch Programming Rules:

1、Sub-command is in this format: Programming Command + Parameters

2、Sub-commands are terminated by semicolons. Note that there is no blank between a sub-command and its terminator semicolon.

3、“Save Programming”(0000160) to terminate

4、Use Barcode Generator software to make the 2D batch barcode.

Code Programming ON

Code Programming OFF

For example, to generate a batch barcode for “Illumination Keep ON”(0200030), “Auto Mode”(0302010), “One Reading Timeout = 2000”(0313000), and “Disable Fixed Length Selection”(0405140)for Inter-leaved 2 of 5.

0200030; 0302010; 0313000 = 2000; 0405140; 0000160; Generate a batch code.

Allow Read Batch Code
【Pro CMD：0001110】

Batch command can contain many commands. Each command is divided by semicolon. Batch command must be ended with save command.
Command structure: command (+ equal mark + setting information)
The setting command list is provided below
There are 4 setting command modes

1、Setting syntax 1: Command

The most command is the one can be set at one time without the command.
e.g.:
The command setting the baud rate as 38400 bps: 0100060
The command setting auto mode: 0302010

2、Setting syntax 2: Command + equal mark + number

This command is used for setting the value of parameter, including the longest and shortest length of the barcode, one reading timeout setting, same barcode reading delay setting, sensitive value setting, etc.
e.g.:
The command setting the one reading timeout as 3000ms: 0313000 = 3000
The command setting the sensitive value as 10: 0312040 = 10

3、Setting syntax 3: command + equal mark + hex (e.g., 0x101a，0x2C03)

This command can be used as setting the user-defined prefix, user-defined suffix, ending suffix, CodeID, increase or cancel the barcode length value, information intercepting, etc. Note: every two hexes in the command stand for a setting character
e.g.:
Append the fixed length 4 of interleaved 2of 5 to 26: 0405160 = 0x041a
Setting the suffix information of the ending as CR/LF: 0310000 = 0x0d0a

4、Setting syntax 4: command + equal mark+ double quotation marks

If the setting information is viewable character, then this mode of setting is appropriate.
e.g.:
The command setting the user-defined prefix information as AUTO-ID： 0300000 = “AUTO-ID”

Produce setting code

Make the command list (ended with save command) to a PDF417, QR code or DataMatrix.
For example, to produce a batch command means: light Always On, Auto Scan, change delay time to 2 seconds, Disable Fixed Length of I 2 of 5. Firstly find commands as follows

0200030;（light Always On）
0302010;（Auto Mode）
0313000 = 2000;（change One Reading Timeout to 2 seconds）
0405140;（Disable Fixed Length of Interleaved 2 of 5）
0000160;（Save）

The batch setting code (PDF417) is as follow,

Use batch setting code

Tools

Read “Code Programming ON”, then read “enable batch setting code”, and then read the batch setting code produced just now, finally Read “Code Programming Off”

Code Programming ON

Code Programming OFF

Code Programming ON
【Pro CMD：0006010】

Allow Read Batch Code
【Pro CMD：0001110】

Batch Setting Code

Code Programming OFF
【Pro CMD：0006000】

Digit Code

It is must to be read save after read digit code.

0

【Pro CMD：0000000】

4

【Pro CMD：0000040】

1

【Pro CMD：0000010】

5

【Pro CMD：0000050】

2

【Pro CMD：0000020】

6

【Pro CMD：0000060】

3

【Pro CMD：0000030】

7

【Pro CMD：0000070】

8
【Pro CMD：0000080】

C
【Pro CMD：0000120】

9
【Pro CMD：0000090】

D
【Pro CMD：0000130】

A
【Pro CMD：0000100】

E
【Pro CMD：0000140】

B
【Pro CMD：0000110】

F
【Pro CMD：0000150】

Code Programming ON

In order to save the received data “Save” has to be read after data transition completed. If error occurs when reading data,
the wrong data can be deleted and the setting up can be done again..

Code Programming OFF

Eg, after a program code is received then ‘1 2 3” in order is received, if then read “Abort One Data of Current Setting” the “3” will be deleted; if read “Abort One String of Current Setting” the ‘123’ will be deleted; if read “Abort Current Setting” both the program code and ‘123’ will be deleted, the device will be on status of “initiating program code”

Save
【Pro CMD：0000160】

Abort One Data of Current Setting
【Pro CMD：0000170】

Abort Current Setting
【Pro CMD：0000190】

Abort One String of Current Setting
【Pro CMD：0000180】

Parameters	Factory Default	Remark
General Programming		
Code Programming	Off	
Send Pro Code Value	Off	
Illumination	Illumination Wink	
Aiming	Aiming Wink	
Decoding Beep	On	
Decoding Beep Type	Type 1	
Decoding Beep Volume	Loud	
Power On Beep	On	
Working Mode	Hand-held Mode	
One Reading Delay	3000ms	
Same Barcode Reading Delay	Multi-reading Semi-prohibit，1500ms	
Sensitivity	Normal Sensitivity	Sensitivity = 11
Exposure Imaging Mode	Normal Exposure Mode	
Power On, Send Product Info	Off	
OCR	Off	
Communication Programming		
Baud Rate	9600	
Serial Port Check	No Check	
Transmit Digits	8 Digits	
Stop Digit	1 Digit	Fixed
Data Format Programming		
Add Prefix/Suffix	Off	
Prefix Sequences	CodeID+User Prefix+AIMID	CodeID+AIMID+(Prefix+Data) +Suffix+Terminators
AIMID	Off	]Cm Mark
CodeID	Off	One or Two Digit，Capital or Small Letter
User Prefix	Off	No more than 10 digits
User Suffix	Off	No more than 10 digits
Stop Suffix	Off	No more than 2 digits
Interception	Off	
Pack	Off	

Parameters	Factory Default	Remark
Symbol		
Code 128		
Enable	On	
Max Message Length	48	
Min Message Length	1	
EAN-8		
Enable	On	
Send Check Digit	On	
Enable 2 Digits Addenda Code	Off	
Enable 5 Digits Addenda Code	Off	
Expand to EAN-13	Off	
EAN-13		
Enable	On	
Send Check Digit	On	
Enable 2 Digits Addenda Code	Off	
Enable 5 Digits Addenda Code	Off	
UPC-E		
Enable	On	
Send Check Digit	On	
Enable 2 Digits Addenda Code	Off	
Enable 5 Digits Addenda Code	Off	
Expand to UPC-A	Off	
Send Default “0”	Off	
UPC-A		
Enable	On	
Send Check Digit	On	
Enable 2 Digits Addenda Code	Off	
Enable 5 Digits Addenda Code	Off	
Send Default “0”	Off	
Interleaved 2 of 5		
Enable	On	
Check	Off	
Send Check Digit	Off	
Max Message Length	80	

Min Message Length	6	No less than 4
Specified Lengths	Off	
ITF-6		
Enable	Off	
ITF-14		
Enable	Off	
China Post 25		
Enable	Off	
Check	Off	
Max Message Length	80	
Min Message Length	4	No less than 4
Code 39		
Enable	On	
Check	Off	
Send Start & Stop Character	On	
Support Full ASCII	Off	
Max Message Length	48	
Min Message Length	1	
Codabar		
Enable	On	
Check	Off	
Send Start & Stop Character	On	Capital ABCD/ABCD Format
Max Message Length	60	
Min Message Length	2	
Code 93		
Enable	Off	
Check	On	
Send Check Digit	Off	
Max Message Length	48	
Min Message Length	4	No less than1
UCC/EAN-128		
Enable	On	
GS1 Databar		
Enable	On	
Send AI(01) Character	On	

EAN•UCC Composite		
Enable	Off	
UPC/EAN Version Enable	Off	
Code 11		
Enable	Off	
Send Check Digit	On	
1 Digit, MOD11 Check	On	
Max Message Length	48	
Min Message Length	4	No less than 4
ISBN		
Enable	Off	
Transmit 13 Digits	On	
Industrial 25		
Enable	Off	
Check	Off	
Max Message Length	48	
Min Message Length	6	No less than 4
Standard 25		
Enable	Off	
Check	Off	
Max Message Length	48	
Min Message Length	6	No less than 4
Plessey		
Enable	Off	
Transmit Check Digits	On	
Max Message Length	48	
Min Message Length	4	No less than 4
MSI-***Plessey***		
Enable	Off	
Transmit Check Digits	On	
Single MOD10 Check	On	
Max Message Length	48	
Min Message Length	4	No less than 4

PDF417		
Enable	On	
Read Single PDF417 Only	On	
Max Message Length	2710	
Min Message Length	1	
Read Forward Direction Barcode Only	On	
QR Code		
Enable	On	
Read Single QR Only	On	
Max Message Length	7089	
Min Message Length	1	
Aztec		
Enable	Off	
Max Message Length	3832	
Min Message Length	1	
Reading Multi-barcodes of an Image	Off	
Data Matrix		
Enable	On	
Max Message Length	3116	
Min Message Length	1	
Read Single DM Only	On	
Rectangular Symbols	On	
Read Forward Direction Barcode Only	On	
Maxicode		
Enable	Off	
Max Message Length	150	
Min Message Length	1	

Symbol	AIM ID	Possible AIM ID Modifiers(m)
Code 128	]C0	
UCC/EAN-128	]C1	
EAN-8	]E4	
EAN-13	]E0	
EAN-13 with Addon	]E3	
UPC-E	]E0	
UPC-E with Addon	]E3	
UPC-A	]E0	
UPC-A with Addon	]E3	
Interleaved 2 of 5	]Im	0,1,3
ITF-6	]Im	1,3
ITF-14	]Im	1,3
China Post 25	]X0	
Code 39	]Am	0,1,3,4,5,7
Codabar	]Fm	0,2,4
Code 93	]G0	
Code 11	]Hm	0,1,3
ISBN	]X0	
Industrial 25	]S0	
Standard 25	]R0	
Plessey	]P0	
MSI-Plessey	]Mm	0,1
GS1 Databar	]e0	
EAN•UCC Composite	]em	0-3
PDF417	]Lm	0-2
QR Code	]Qm	0-6
Aztec	]zm	0-9, A-C
Data Matrix	]dm	0-6
Maxicode	]Um	0-3

Reference:

» ISO/IEC 15424:2008

» Information technology – Automatic identification and data capture techniques – Data Carrier Identifiers (including Symbology Identifiers)

Symbol	Code ID
Code 128	j
UCC/EAN-128	j
EAN-8	d
EAN-13	d
UPC-E	c
UPC-A	c
Interleaved 2 of 5	e
ITF-6	e
ITF-14	e
China Post 25	X
Code 39	b
Codabar	a
Code 93	i
Code 11	H
GS1 Databar	R
EAN•UCC Composite	y
ISBN	B
Industrial 25	I
Standard 25	f
Plessey	n
MSI-Plessey	m
PDF417	r
QR Code	s
Aztec	z
Data Matrix	u
Maxicode	x

Symbol	ID Number
Code 128	002
UCC/EAN128	003
EAN-8	004
EAN-13	005
UPC-E	006
UPC-A	007
Interleaved 2 OF 5	008
ITF-14	009
ITF-6	010
China Post25	011
Code 39	013
Codabar	015
Code 93	017
ISBN	024
Industrial25	025
Standard25	026
Plessey	027
Code11	028
MSI-Plessey	029
EAN•UCC Composite	030
GS1 Databar	031
PDF417	032
QR Code	033
Aztec	034
DataMatrix	035
Maxicode	036
User-Define Code	041
SPEC_OCR_B	064